

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : <b>G06F 17/60</b>		A1	(11) International Publication Number: <b>WO 98/49644</b> (43) International Publication Date: <b>5 November 1998 (05.11.98)</b>
(21) International Application Number: <b>PCT/US98/08407</b>		(81) Designated States: <b>AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DR, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KR, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</b>	
(22) International Filing Date: <b>27 April 1998 (27.04.98)</b>		Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	
(30) Priority Data: <b>60/044,372 28 April 1997 (28.04.97) US</b>			
(71) Applicant ( <i>for all designated States except US</i> ): <b>ARIBA TECHNOLOGIES, INC. [US/US]; 1314 Chesapeake Terrace, Sunnyvale, CA 94089 (US).</b>			
(72) Inventors; and (75) Inventors/Applicants ( <i>for US only</i> ): <b>ADAMS, Norman [-US]; 1502 Bedford Avenue, Sunnyvale, CA 94087 (US). BROWN, Marc [-US]; 3549 Julie Court, Palo Alto, CA 94306 (US). CARLSTROM, Brian [-US]; 2343 Running Water Court, Santa Clara, CA 95054 (US). ELKIN, Brian [-US]; 1180 Reed Avenue #48, Sunnyvale, CA 94086 (US). HEGARTY, Paul [-US]; 34032 Webfoot Loop, Fremont, CA 94555 (US). HASKIN, Guy [-US]; 944 Erica Drive, Sunnyvale, CA 94086 (US). PUTANEC, Boris [-US]; 1175 Laurel Street, Menlo Park, CA 94025 (US).</b>			
(74) Agents: <b>HODES, Alan, S. et al.; Limbach &amp; Limbach L.L.P., 2001 Ferry Building, San Francisco, CA 94111 (US).</b>			
(54) Title: <b>OPERATING RESOURCE MANAGEMENT SYSTEM</b>			
(57) Abstract			
<p>A software system efficiently procures operating resources within an enterprise. A requisition record generating module generates a requisition record for a requisition. The requisition record indicates at least an operating resource that a requestor desires to purchase. The requisition record generating module generates the requisition record responsive to a combination of input by a requestor and operating resource information in an operating resource information database. An approval path determining module, responsive to the requisition record and to approval rules in an approval rules database, determines an approval path for the requisition record, among various ones of a plurality of possible approvers, required to approve the requisition record. An approval path handling module guides the requisition record along the determined approval path, and the approval path handling module generates a global approval indication in response to the requisition record successfully traversing the approval path.</p>			

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finnland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslavia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece		Republic of Macedonia	TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
RJ	Burundi	IE	Iceland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's	NZ	New Zealand		
CM	Cameroon		Republic of Korea	PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

## OPERATING RESOURCE MANAGEMENT SYSTEM

5

### CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority from provisional application no. 60/044,372 filed April 28, 1997.

10

### TECHNICAL FIELD

The present invention is a software system for procurement of operating resources and, more particularly, is a software system that automates the cycle of operating resource acquisition.

15

### BACKGROUND

Today, operating resources account for as much as a third of a sales dollar in the typical Fortune 1000 company. Nearly 95 percent of all goods and services purchased by corporations are done so through paper-based processes. Predominant use of paper-based buying is evidence that legacy business-to-business electronic commerce systems do not provide a solution for the bulk of corporate buying processes. Research indicates that a cost savings of 5 percent in operating resource goods and services cost will commonly result in a 28 percent increase in a company's profits.

20

Traditionally, methods of purchasing operating sources (e.g., industrial supplies, office supplies and other non-production supplies) are extremely

25

- 2 -

fragmented and, thus, inefficient. What is desired is an integrated, enterprise-wide solution.

### SUMMARY

5        With the present invention, electronic automation, consolidation and leveraged buying through operations resource management (ORM) present a significant opportunity for companies to lower costs, and thereby dramatically enhance the bottom line.

10        Operating resource management replaces the traditional, fragmented methods of purchasing operating resources. Through new technology -- in one embodiment, namely intranets, extranets and Java™ -- operating resource management supersedes decades of inefficiency with a consolidated corporate electronic commerce system, to fully capture economies of scale and leverage supplier relationships. The operating resource management system of the present 15        invention provides at least three key benefits:

- Automation of the entire acquisition cycle by incorporating all of the functions that make up the purchasing process, from request through payment.
- Reduced operating resources costs through economies of scale and facilitation of a shift in purchasing professionals' roles from tactical transaction processing to strategic supply-chain management.
- Leverage of existing enterprise systems and electronic commerce systems through easy linkage to existing data sources, as well as suppliers' electronic commerce systems.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 shows the engineering architecture of an embodiment of the invention.

5 Figure 2 shows the extensibility architecture of an embodiment of the invention.

Figure 3 shows the procurement process flow of an embodiment of the invention.

10 Figure 4 shows the product feature description of an embodiment of the invention.

Figure 5 shows the user environment features of an embodiment of the invention.

15 Figure 6 shows the system environment features of an embodiment of the invention.

Figure 7 shows the business modules included in an embodiment of the invention.

20 Figure 8 shows the system adapters of an embodiment of the invention.

Figure 9 shows the installation and implementation comprehended in an embodiment of the invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

25 In one embodiment, the operating resource management system in accordance with the invention is a suite of software modules that automates the purchasing of goods and services within a corporation. Preferably, some of the modules operate on a server computer of a network and others of the modules operate with the system of the present invention, a company can reduce the cost

- 4 -

of transactions and increase overall productivity, with direct benefit to the bottom line.

Some key features of the system are:

■ **Walk-up User Interface on Any "Desktop" in the Company --**

5 The user interface makes the product accessible to employees with little or no training, helping and guiding the employee through the requisitioning process.

Use of the system need not be limited to a select purchasing group.

■ **Ubiquitous and Easy Information Access for All Employees --**

10 Requesters and approvers alike can see the current state of any of their requisitions at any time and, thus, are always kept in the loop when something changes about their requisition.

■ **Authenticated Approval Flow --** The system enforces the corporation's business rules and validates requisitions, ensuring accurate and complete data.

15 ■ **Adapters For Integrating with the Enterprise --** The system provides adapters to integrate the system into legacy enterprise data sources such as ERPs, Human Resource Management Systems (HRMSs), Email systems and directory services.

20 ■ **Extensibility and Flexibility --** The system provides complete flexibility in describing the data fields and business rules of each individual company.

25 Referring to Figure 1, in the embodiment 100 shown therein, a key module is an Enterprise Commerce Server 102, which includes Intranet application server software, preferably written in Java. A set of associated client-side software applications are also preferably written in Java. The Java client software 112 preferably runs in a Web browser (or, alternatively, is accessible

- 5 -

via the web browser), on every desktop (shown in Fig. 1 as "Mac", "Win95", "WinNT" and "Unix"), and provides the user interface for creating and approving requisitions. The Java server software 102 preferably runs on a single shared machine, and provides "back-end" services.

5 Supplementing the Enterprise Commerce Server 102 are a number of Adapters 122, which integrate the system 100 into legacy enterprise data sources such as ERPs, HRMSs, E-mail systems and directory services. The system design is modular, allowing for any number of adapters to be plugged in without requiring revisions to the Enterprise Commerce Server software 102.

10 In practice, the system in accordance with the invention is easy to use. The system is accessible both to infrequent users, people who buy something only once or twice a year, and frequent users, purchasing agents, administrators, and others who will use the system nearly daily.

15 Most users of the system will be *requisitioners*: employees who need to buy something. Most of these requisitioners are casual users will enter requisitions, via the client software 112, using a *requisition wizard*. Figure 2 is a system diagram that shows generally how functionality (particularly functionality that can be extracted for a particular implementation) is apportioned in one embodiment of the system. Reference numeral 202 designates the requisition 20 wizard module.

20 Figure 3 is a flowchart that shows how a requisition is processed in a typical embodiment, from requisition creation to approval, to receipt of requisitioned goods/services, and to reconciliation. In Fig. 3, the reference numeral 302 designates process steps associated with creating a requisition.

25 Figure 4 is a top-level "product feature" description of an embodiment of the invention, while Figures 5 to 9 are diagrams that show the product features

- 6 -

at a more detailed level. As can be seen from Figure 5, the wizard software is within the "requisitions" portion 502 of the user environment 500.

The wizard 202, 302 "walks" an employee through a number of questions to guide him through the process of making a purchase. For example:

5           ■     What do you want to buy today?

Generally, the first question is "what do you want to buy today?" The wizard 202, 302 offers several ways to find the answer, always encouraging employees to choose from approved items. Perhaps the employee will just choose an item from a list of his own personal favorite frequently-ordered items 10 304. Or perhaps he will be able find an appropriate item by searching through the product information database 306. Or perhaps he will find the item by looking through a number of approved on-line catalogs 308. (In one embodiment, the system supports such on-line catalogs, but does not itself include any catalog authoring tools.)

15           Preferably, only as a last resort will the wizard prompt the employee to type in the name of a supplier and part explicitly (310). Entering such ad-hoc items, items that are not in the list of approved items, will typically trigger new approval rules. For example, the approval rules of many companies will cause the Purchasing Department to be put into the approval loop at this point, to 20 require a Purchasing Agent to decide whether to approve the new item. Because ad-hoc entry usually involves additional overhead, the wizard guides the employee through the process in such a way as to avoid ad-hoc entry whenever possible.

25           ■     Who is going to pay for this item?

Another important part of the requisition is the accounting information: who will be paying for the item. The accounting structure typically varies from

- 7 -

company to company, be it Division, Department, Account, or Project. The wizard can be configured to display and ask for different accounting fields for each company, helping to ensure that the employee will always be presented with choices that are relevant and appropriate.

5        The wizard continues in this vein, asking questions and gathering other data about payment, billing, shipping, and the like. Throughout the process, the emphasis is on browsing and selecting, rather than typing, on channeling the employee toward standard answers, and on generating error-free requisitions.

10      Any employee who handles a requisition, be it requester or approver, can add commentary or attach documents to the requisition. The ability to comment and explain can go a long way toward maintaining alignment, making requisitions understandable to approvers, allow approvers to provide feedback to requesters, and help approvers make a decision about whether to approve the request.

15      After a request is submitted, another piece of user interface software 500 comes into play: the Organizer 504 (Figure 5). In a preferred embodiment, the Organizer 504 software provides a folders-style view of existing requisitions, designed to help group and organize large collections of requisitions.

20      When a request is submitted, approval software (approval engine 110 in Figure 1; step 322 in Figure 3; approval flow software 602 of the system environment 404, in Figure 6) inspects the approval rules of the company, decides who needs to approve the request, and notifies the first required approvers, preferably by e-mail, that there is a requisition waiting for their attention. In one embodiment, the e-mail notification message includes a URL hyperlink that points the approver directly to the Organizer software 504 via his browser, to display the requisitions waiting for this person's approval. The

- 8 -

approver can approve or deny, and make comments, asking for more information or clarification.

Whenever there is a status change in a requisition, notification software 120 sends an e-mail message notifying the requester and any other interested parties. The system uses notification e-mails throughout the approval process to keep users informed about the current state of a requisition. Requesters can also use the Organizer software 504 to check the status of a request at any time, to keep apprised who has or has not approved it, when it has been fully approved, and so on.

Using the Organizer 504 and the commenting mechanism, everyone in the approval process (e.g., approvers, requisitioners, and Purchasing Agents) can ask each other questions, view the status of a requisition, or make comments about the requisition, reducing confusion and improving communication.

After a requisition is fully approved, supplier interface software 330 communicates with the suppliers to give them the order. The system may communicate with supplier systems via conventional means, such as fax and e-mail. When a requisition is completed, the system will check the requisition to determine which suppliers are involved, determine the preferred method of ordering for those suppliers, and use that method for transmitting the requisition to the supplier. The pieces of the system used to transfer orders for fulfillment are known as the ordering modules 130 (Figure 1) (see also, Fig. 7).

There are three ordering modules 702 (see Figure 7): a Purchasing Card module, a Direct Order module, and a Purchase Order module.

Eventually the requisition will be approved, submitted, and fulfilled. As discussed above, the system may communicate orders to the supplier via conventional means (fax and e-mail). But once the item is shipped, and arrives

- 9 -

on the requisitioner's doorstep, receipt of the item must be acknowledged before payment is made.

The system includes a user interface for acknowledging receipt, which allows employees to acknowledge that various items have been received. These desktop receipts are all stored in the system and not integrated with the ERP.

In addition to the requisitioning population -- the requesters and approvers -- there is another class of users: members of the Purchasing Department. The Purchasing Agents are responsible for the buying practices of the company, ensuring that the company is doing business with the most appropriate suppliers and ensuring that employees are buying the most appropriate items.

It is desirable to get the Purchasing Department out of the loop of the requisitioning process. However, it is also desirable for them to retain control over the process. The system balances those desires by involving the Purchasing Department only when there something unusual about a particular requisition. For example, a Purchasing Agent will typically be involved when someone tries to buy an item from an unapproved supplier or when someone specifies an unusual ship-to address.

The Purchasing Department, via Administrative Tools software 506 (Fig. 5), defines which products and suppliers are "approved". The Purchasing Department also implicitly and explicitly manages the Product Information Database, which describes the collection of approved products and services. The Administrative Tools software 506 provides Purchasing Agents with the ability to add or remove items from the Product Information Database, or remove items when a relationship with a supplier changes or an item is otherwise obsolete.

- 10 -

Another piece of the user environment 500 of the system is Reports and Graphs software 508 (Fig. 5), which allows a company to summarize, group, and understand its purchasing history. The system preferably provides software to generate one collection of predefined reports that can be run at any time, giving purchasing agents and system administrators information they can use to refine their buying process and maximize the gain from automation. This information can be a valuable tool for gaining understanding and using that understanding to make improvements, such as modifying the approval processes or switching suppliers or updating the history of purchases to encourage different buying patterns by end-users in the future.

The system environment 404 is the "back-end", the parts of the system that do not directly interact with the users.

Flexibility and configurability are important to the design, because each company wants to maintain slightly different data and enforce slightly different business rules. To support the goal of flexibility, one embodiment of the system is designed to allow companies to customize the set of data fields, recognizing that every company has a slightly different set of information that must be kept.

These "extensible fields" are defined by the customer, on a system-wide configuration file, and are available both via user interface software and throughout the business rules. There are examples throughout this patent application of how such fields can be used. For example, a company might wish to extend the set of data fields to describe its own accounting policies and categories.

Approval rules are the conditions that a company uses to decide which approvers are required for a particular requisition. The system preferably provides a mechanism for describing the approval rules that is flexible enough to

model the existing process at any company. Every company will have its own set of rules, although there are often basic similarities, and many rules can be copied from simple examples. For example, an approval rule may be expressed as a set of conditional expressions, such as "If the amount of this purchase is over \$25,000 and it is for software, then the Information Systems department must approve the purchase."

There are at least two things to note about the approval rules. First, approval rules can be based on any field in a requisition, including the fields that are added during the implementation process. So, in addition to standard approvals based on requisition or line item amounts, for example, the Facilities Manager might need to approve any furniture purchase, or the IS department might have to approve any computer system purchase.

In addition, an approver designation does not have to be given to a particular individual in the company. Rather, a particular role can be designated in an approval rule as an approver. An example role is the "CFO" role. At any given time, this role is played by a single individual in the company, but if there is a new CFO hired, then all the requisitions that are awaiting approval by the CFO can be approved by the new CFO when he comes on board, without any system maintenance. When the individual who is the new CFO is designated in the system as CFO, he will be notified of all requisitions pending approval for the CFO role.

Roles can also describe a group of people. For example, there is the role of Purchasing Agent. There might be any number of Purchasing Agents in the company, but if the role Purchasing Agent is assigned to a requisition, then all individuals designated by the Purchasing Agent role see it for their approval.

- 12 -

In one embodiment, if any one of them approves it, the requisition is approved for that role.

5

Adapters 122 (Fig. 1) and 800 (Fig. 8) are software modules that link the system to the rest of the enterprise. The system obtains and stores all data through an adapter layer that integrates the system with existing services, using data that already exists in those legacy systems. This assists in avoiding duplication of information within the enterprise. If an adapter for particular data does not exist, then the system will store the information internally, but if the data exists elsewhere in the enterprise, then the system will use the data through an adapter.

10

Significant adapters are adapters 804 to the ERP system in the company. These adapters may be customized to interface with each ERP (e.g. Oracle 10.4, 10.5, 10.6, SAP, Baan, D&B, PeopleSoft, etc.). The ERP adapters can obtain simple information from the ERP like units of measure, accounting information, etc., as well as item templates, supplier information, approval matrices, and other relatively static information. They are also capable of storing the entire approved requisitions back into the ERP.

15

20

Another source of information in a company is the description of all of its employees, including names, organization information, contact information, and so on. Often this information comes from an HRMS system. In one embodiment, an HRMS adapter 806 (e.g., to Peoplesoft, Version 5.0) is provided.

25

There are also adapters 808 for user authentication systems. User authentication information is commonly stored in external directory services like LDAP, Microsoft Exchange, or Unix NTS.

Now that an embodiment of the system has been broadly described in overview, portions of the embodiment are now described in greater detail.

#### User Environment

5 This section describes the pieces of the system that employees see: the user interfaces and associated help and wizard systems.

When reading this section, the *extensible fields* design should be kept in mind. That is, each instantiation of the system can have a slightly different user interface, customized to present the information appropriate for that particular company. This document contains a number of tables describing data fields.

10 Each table differentiates two kinds of fields:

- An *intrinsic* field is a field that the system expects to find.
- An *extrinsic* field is an additional custom field, typically added during installation. There can be any number of extrinsic fields, depending on what a particular company desires. The system will store and display the information in these fields, but in a preferred embodiment, will not depend on having the information there. This document contains a number of examples of extrinsic fields, to illustrate how they can be used.

#### Requisitions

20 This section describes the basic functionality of the system: how employees go about asking for something by creating a requisition.

1. Starting New Requisitions

The user interface for creating requisitions should be appropriate for both novice users -- people who may use the system only once or twice a year -- and expert users, who may use the system almost daily.

5 The system allows users to create new requisitions in at least the following ways:

- a. With the requisition Wizard, which guides the employee through a series of questions at each step, providing navigational aids to keep track of the big picture, and presenting lists of choices whenever possible instead of asking the employee to type things in.
- b. By cloning existing requisitions.

2. Filling in Requisitions

A requisition can contain any number of individual line items that the employee would like to order. In one embodiment, there are some parts of a requisition that are shared among all line items, and others that are specific to individual line items. To initialize the information that applies to the entire requisition, the system will:

- a. Fill in fields of the requisition from the employee's personal profile, as available. For example, the shipping information and default department will be initialized from the personal profile. The employee will be able to change any of these defaults for a particular requisition.
- b. Generate unique alpha-numeric identifiers for each requisition.

The format of the numbers can include a prefix string, defined as part of the company configuration.

- 15 -

c. Allow the employee to give titles to requisitions, more mnemonic than the requisition identifier.

5 d. Provide a way for one employee to prepare a requisition and submit it for someone else. That is, allow the creator and submitter to be different people. If the requester and the submitter are different, then the standard approval rules will put the requester as the first approver.

10 e. Allow the employee to specify a hold date on a requisition. The hold date is the date that the employee would like the requisition to be actually submitted to Purchasing. If the requisition is fully approved before the hold date, then the system will hold the requisition until the hold date. If there is no hold date, then the system will submit the requisition as soon as it is fully approved. In one embodiment, holding is a company-wide feature, and can be turned off in the system profile for an entire company, if that company does not choose to allow the hold functionality.

15 f. Allow the employee to specify the reporting currency of a requisition and display the total for the requisition in that currency. The reporting currency of a requisition defaults from the employee's default reporting currency. The system will display each currency with the appropriate precision.

20 g. Timestamp each requisition with the time the employee initiated the requisition.

Table 1, below, summarizes the fields of a requisition record.

Table 1: Fields of Requisition

Field Name	Description	Intrinsic?
1. Number	Unique ID for this requisition is assigned. Uses the prefix string defined in the system profile.	Intrinsic
2. State	{Unsubmitted, Submitted, Fully Approved}	Intrinsic
3. Requester	Name of person who submitted the requisition	Intrinsic

Field Name	Description	Intrinsic?
4. Preparer	Name of person who prepared the requisition.	Intrinsic
5. Title	Name chosen by the employee	Intrinsic
6. Creation Date	Date and time on which the requisition was generated; the New requisition time.	Intrinsic
7. Submitted date	Date and time on which the requisition was submitted; the Submit time.	Intrinsic
8. Approved Date	Date and time on which the requisition was fully approved.	Intrinsic
9. Hold-till Date	Date on which the employee would like the requisition released to purchasing.	Intrinsic
10. Ship-to	Default ship-to address. Can be overridden for individual line items.	Intrinsic
11. Reporting currency	Default currency for displaying totals and for ad-hoc items that the user creates.	Intrinsic
12. Line items	Individual items being ordered. See the table below.	Intrinsic
13. Department	Used as the default for newly-created line items, which can be overridden for individual line items. Initialized to the requester's department, but the requester may wish to override that initialization and provide a different default.	Extrinsic
14. Deliver-to	Used for internal distribution, in companies with no desktop receipt capability.	Extrinsic
15. Total Cost	Total cost calculated from Price Extended	Derived
****	Extensible fields, custom to this company.	

15

### 3. Adding Line Items

After creating a requisition, the employee can add any number of products and services to it, as *line items* of the requisition. The system guides employees toward choosing items from approved sources, rather than asking them to type in information manually: the interface emphasizes copying and selecting and deemphasizes typing.

20

The system provides the following ways for an employee to create a line item in a requisition:

a. By searching or browsing through a Product Information Database. The Product Information Database for a company is the collection of all items that have been approved for purchase.

5 The user may navigate the tree hierarchically, say by navigating through choices *like Office Supplies, Computer Peripherals, Industrial Equipment, etc.* and then from *Computer Peripherals* through *Network Adapter, Disk Drive, Monitor, etc.*

10 The user is also able to search the Product Information Database with a "contains" search on the following fields: Item Description, Supplier Part Id, Mfg. Part Id, Mfg. Name, and Commodity Code.

15 b. By choosing from a list of personal favorites. In one embodiment, a Favorites list is a "flat" list of up to 25 items that the employee has chosen and marked as Favorites.

20 c. By manual entry, typing in or using the copy function to order an item that is not available either from the Product Information Database or from any Web catalog. When entering an item from scratch, the requester can suggest a supplier (by selecting supplier from a quickpick list or by directly typing it in), or leave it out, to be chosen by the Purchasing Agent. Requisitions for items that are not from approved sources typically trigger special approval rules, such as requiring a Purchasing Agent to approve the new item and supplier. The system provides facility for each company to define its own rules for handling such requests.

- 18 -

4. Filling in Line Items

After adding a line item, the employee is able to modify any of the information about that line item, as appropriate. Quickpicks are provided for all fields to maximize accuracy. In particular, the employee is able to:

- 5 a. Specify the quantity to be ordered
- b. Specify the ship-to and deliver-to addresses.
- c. Modify the carrier or carrier method, if the defaults from the supplier are not appropriate. For example, the employee might want to ask for something to be shipped faster than the supplier's usual practice.
- 10 d. Specify a need-by date, to inform the supplier of the date by which the item needs to arrive in order to be useful.

The fields of a line item in a requisition record, in one embodiment, are described below in Table 2.

Table 2: Fields of a line item

Field Name	Description	Intrinsic?
1. Product Information	Information taken from the Product Information Database, which includes all information that the user cannot change: supplier, price, commodity code, unit of measure, etc.	Intrinsic
2. Quantity	Quantity of the item to be purchased	Intrinsic
3. Ship-to	Ship-to address for this line item. Defaults to that of the entire requisition.	Intrinsic
4. Deliver-to	Deliver-to address for this line item. Defaults to that of the entire requisition.	Intrinsic
20 5. Carrier	For shipping item. "FedEx" or "UPS", e.g. Defaults from item template for this item.	Intrinsic
6. Carrier Method	E.G. "second day air"	Intrinsic
7. Need-by date	Entered by employee, to describe the date that he or she needs the item to arrive.	Intrinsic
8. Accounting Information	Accounting information, such as department, project, cost center, and account code.	Extrinsic
9. Price Extended	Calculated from Quantity X Price.	Derived
*****	Extensible fields, custom to this company.	

5. Comments and attachments

Any employee who handles a requisition, be it requester or approver, can add commentary or attach documents to the requisition, helping everyone who sees it to better understand the requisition. The ability to comment and explain can go a long way toward making requisitions understandable to approvers, allowing them to provide feedback to requesters, and help them make a decision about whether to approve the request.

10 The commenting mechanism:

a. Allows users to add textual comments to any requisition or line item, using "threading" to maintain context.

b. Allows users to specify the audience for a comment, which can be any of *Approvers*, *Requesters*, *Suppliers*, *Purchasing*, or *All*. Comments are visible only to the specified audience.

15 c. Allows users to attach electronic documents to comments. To ensure platform independence, this feature is preferably implemented using a browser's mailing facility. If employees can send attachments from their mailer, then they can attach documents to a requisition.

20 6. Submitting Completed Requisitions

When an employee has finished filling out a requisition and asked to submit it, the system will perform the following checks before actually submitting the requisition for approval:

25 a. Find all mandatory fields (as distinguished from optional ones), and ensure that they have values. If there are any missing values, then the requisition is returned to the user for more editing.

- 20 -

5           b.     For each field that has a value, verify the data in that field to ensure that values are valid for the field involved as well as validating that the account combinations (e.g. Account, department, etc.) are valid. If there are validation procedures for any of the extrinsic fields (custom to this company), then run those validation procedures as well. If there are any invalid fields, then return the requisition to the user for more editing.

10           c.     Check each line item and assign a suggested buyer for that line item. The company can parameterize the rules for assigning buyers to line items, based on any fields in the requisition. If there is a direct order agreement with this supplier, the suggested buyer will be the buyer agreed on in the supplier profile. (The supplier profile specifies whether there is a direct order agreement in effect.)

15           d.     Add bill-to information, using default from system profile.

15           e.     Timestamp the requisition with the current date and time, as the submission date of the requisition.

20           f.     Determine the approval path for this requisition, using the approval rules defined in the business rules for the company, and allow the employee to preview the approval path. Allow the employee to either confirm the submission, or cancel it and return to editing the requisition.

#### The Organizer

25.           The user interface software for categorizing and classifying requisitions is known as the *Organizer 504* (Figure 5). Approvers use the Organizer software to approve or deny requisitions and requesters use it to check status and history.

When a request is submitted, the system checks the approval rules of the company, decides which users need to approve the request, and in what order,

- 21 -

and then notifies the first approver that there is a requisition waiting for attention. Each approver sees new requisitions in a folder of *incoming* requisitions, and will need to take action on the requisition to move it to a different folder.

5

### 1. Approving or Denying Requisitions

When an approver goes to the Organizer interface, be it from a notification message, a bookmark, or some other hyperlink, the Organizer displays the incoming requisitions for that approver, showing the information in Table 3, below, for each requisition:

10

**Table 3: Fields of an approval request**

Field	Explanation
1. Role	Role required for this approval, such as "CFO".
2. Reason	The reason this approver needs to approve; this is the justification field
3. Actual Approver	The name of the person who is filling the approval role. This is typically the approver's name, if the approver is looking at incoming requisitions.
4. Required/Optional	Boolean indicating whether this approval is required, or whether this approver is a "watcher".
5. Submission Date	The submission timestamp.

15

Whenever an approver acts on a requisition, the system timestamps the requisition with the name of the approver and the time of the action.

20

If an approval is marked as required, the approver can take any of the following actions on the requisition:

25

a. Approve the requisition. An approval will trigger any notifications specified in the business rules for this company, mark the request as approved for this approver, and add the request to the incoming folder for the next approver in the approval chain. After approving a request, the approver can move it into some other folder, or leave it in the incoming folder.

b. Deny the requisition. When an approver denies a requisition, the system sends an e-mail notification to the requester, and stops any further approval requests in this serial approval chain. If the requester does nothing in response to a notification of denial, the request will eventually time out. If the requester modifies the request and resubmits it, the system starts the approval process again, as described in step 5) below.

c. Add an additional approver to the approval chain, either before or after this approval. For example, an approver might want to say "Please ask Ed if he approves, and then come back to me".

**10 d. Add comments.**

e. Modify the requisition. Not all approvers can change all fields, however: a Purchasing Agent can modify any field of a requisition; other approvers can modify only a limited set of fields in the requisition. The definition of which fields approvers can modify is part of the company's configuration of the data fields and is typically set up during installation.

When an approver modifies any field of a requisition, the system recalculates the required approvals and invalidates any existing approvals for that line item (if it was a line item that changed) or for the entire requisition (if the requisition itself was changed). Modifying a field can thus trigger reapprovals from users who have already approved the requisition, or trigger the addition of new approvers into the chain, depending on the approval rules.

If the approver is marked as Optional, then this approver is a *watcher*, not a true approver. Watchers are bystanders: they see the requisition but their approval is not required. Watchers can take any of the following actions on the requisition:

- 23 -

- Add an additional approver to the approval chain, either before or after this approval.
- Add comments.

5 2. Approving in the place of others

The system maintains the notion of *chain of command* derived from the "immediate supervisor" information in each employee's personal profile. Using that information, the system allows certain authorized approvers to approve in the place of another approver:

10 a. The system allows approvers to get a list of the requisitions that are waiting for approval from a lower-level approver (as defined by the business rules) and approve them directly. A high-level approver can explicitly approve in the place of any lower-level approver if the two approvers are in the same chain of command.

15 3. Removing Requisitions or Approvals

20 a. A requester can withdraw his or her own requisitions at any point during the approval process, until the requisition is fully approved. A withdrawn request returns to the Unsubmitted state and any approvals that have been recorded so far will be removed.

b. An employee who has the role of Purchasing Agent can remove approvals from any requisition.

25 4. Organizing requisitions

The Organizer helps employees organize groups of requisitions. It allows employees to:

- 24 -

a. Sort the requisitions by any of the fields that are displayed in the outline view. That is, if there is a column header for a field, then the employee can sort on that field.

5 b. Filter the requisitions by any of the fields that are displayed in the outline view. That is, if there is a column header for a field, then the employee can use the value of that field to restrict the information being displayed.

10 c. View the details of any requisition, including all line items, approvals, and comments.

15 d. Put the results of a search into a folder. For example, a purchasing agent might wish to examine all outstanding requisitions for items from a particular supplier.

e. Print any requisition on letter paper.

f. Fax any requisition, on platforms with integrated fax support.

15 Now, administration of the system is described, in the sense of making changes that are not part of the server configuration itself.

20 1. Maintaining Personal Profiles

An employee's personal profile is described in a configuration file that sets values for a user of the system. There are two kinds of information in a personal profile: Human Resources data fields and specific data fields. The Human Resources data fields are preferably initialized from the HRMS adapter, if there is one at the site, and are also updated regularly from the HRMS adapter.

25 The specific data fields are created and maintained entirely within the system.

The system:

- 25 -

- a. Allows employees to view and edit the specified fields of their own personal profiles, in a form consistent with the rest of the UI.
- b. Submits all changes to personal profiles for approvals, as described in the approval rules of the company.
- 5 c. Allows employees to view the Human Resources data fields that are passed through from the HRMS adapter.
- d. Allows employees to add or remove items from their favorites list.

Table 4, below, lists the specific data fields of a personal profile.

10

**Table 4: Fields of Personal Profile**

Field Name	Explanation	Intrinsic?
1. Organizational Level, Numeric	Numeric degree of separation from CEO.	Intrinsic
2. Delegation of authority (DOA)	Any employee can designate approval authority to another user, for some period of time.	Intrinsic
3. Start date of DOA	Start date for DOA.	Intrinsic
4. Termination date of DOA	Expiration date for DOA.	Intrinsic
5. Reason for DOA	A comment; a textual description of why the DOA is in effect. For example, "vacation".	Intrinsic
6. Notification Frequency	As they occur, on interval, etc.	Intrinsic
****	Extensible fields, custom to this company.	** Extrinsic

20

## 2. Maintaining the System Profile

The system profile contains configuration values for an instance of the system. The system profile (an example of which is shown in Table 5) is created when the system is installed. It is intended primarily for setting default values that will be used when creating profiles for new employees.

25

The system:

- a. Allows the administrator to change the fields of the system profile, using a simple text editor or spreadsheet.

- 26 -

Table 5: Fields of a System Profile

1. System Name	Name of the company.	Intrinsic
2. URL	URL of home page for this system	Intrinsic
3. Approval escalation time	Default interval before approval is escalated.	Intrinsic
4. Time-out interval	Time span before a requisition times out, if it has been in the system with no action.	Intrinsic
5. Base currency	System's standard currency	Intrinsic
6. Fiscal Year	Date on which the fiscal year for this company begins; used to calculate dates for reporting purposes.	Intrinsic
7. Notification frequency	Default that can be overridden by employees.	Intrinsic
8. No notification okay?	Boolean indicating whether employees can turn off notifications.	Intrinsic
9. Hold dates okay?	Boolean indicating whether employees can specify hold dates on requisitions.	Intrinsic
10. Default ship-to address	Default that can be overridden by employees.	Intrinsic
11. Default bill-to address	Default for this company	Intrinsic
12. Requisition number prefix string	Prefix used when numbering requisitions.	Intrinsic
13. Direct Order number prefix string	Prefix used when numbering direct orders	Intrinsic
14. ****	Extensible fields	****

### 3. Maintaining the Product Information Database

The Product Information Database of a company is the collection of item templates for items that are approved for purchase inside the company. Item templates are maintained entirely on the system. An example item template is illustrated in Table 6. The Purchasing Department of a company is typically responsible for maintaining the Product Information Database, helping to make it an accurate and valuable resource.

The system allows purchasing agents to create, edit, and remove item templates. This functionality is available only to purchasing agents. It allows them to:

5 a. Create new item templates. The need to create new item templates arises most often when there is a requisition for an item that is not in the Product Information Database. If the Purchasing Agent decides to approve the item, he or she will create a new item template for it and decide whether to add it to the Product Information Database.

10 b. Edit existing item templates. A purchasing agent can modify an existing item template, (e.g., update supplier information or price).

15 c. Remove existing item templates. A purchasing agent can deactivate an item from the Product Information Database, if the purchasing agent decides that the item is invalid or no longer recommended. This can happen for any number of reasons, such as when the relationship with a supplier changes or when a particular item is no longer available from the supplier.

20 When a purchasing agent makes such a change, he or she can use the Organizer view to check all outstanding requisitions to see if there are any that are impacted by the change.

25 d. Read in text files from suppliers, with SIC code, [WHAT IS SIC?] map those SIC codes into internal commodity codes, and then add the relevant items into the Product Information Database.

e. Build and maintain a hierarchical view of the Product Information Database, so users can find things navigating about through categories.

Table 6: Item Template

1. Item Number	Number that uniquely identifies the item. Defined by the system.	Intrinsic
2. Item Type	Key that assigns the item to a group of items (e.g., office supplies).	Intrinsic
3. Commodity Code	Commodity code of the item. Commodity codes are per-company.	Intrinsic

5	1. Item Number	Number that uniquely identifies the item. Defined by the system.	Intrinsic
	4. Desktop Receipt ?	Whether the item is eligible for desktop receipt.	Intrinsic
	5. Delivery lead time, in Days	Number of days needed to procure the item when it is purchased externally. Need a value for "unknown."	Intrinsic
	6. Supplier ID	Unique ID for the supplier of this item	Intrinsic
	7. Company Unit Price	Purchase price, per unit, in this company	Intrinsic
	8. Supplier URL	URL for additional information.	Intrinsic
	9. Manufacturer URL	URL for additional information	Intrinsic
	10. Carrier	Preferred carrier for this item	Intrinsic
	11. Carrier method	Preferred method for this item	Intrinsic
	12. Transfer Method	{ERP, Direct Order, None} Dominates over supplier designated transfer method	Intrinsic
	13. Supplier	Link to the supplier.	Intrinsic
	14. UOM	Unit of measure for item	Extrinsic
	15. Item Description	Textual description of the item	Extrinsic
	16. SIC code	Standardized code for the item.	Extrinsic
10	17. List unit price	Purchase price, per unit, set by supplier	Extrinsic
	18. Buyer	Role responsible for buying the part; input to the approval rules	Extrinsic
	19. Taxable	Boolean indicating whether item is taxable	Extrinsic
	20. Supplier Part Number	ID for this item, from the supplier	Extrinsic
	21. Manufacturer part number	Id from manufacturer	Extrinsic
15	22. Manufacturer name	Name of manufacturer	Extrinsic
	****	Extensible fields	****
20	The system provides a reporting facility to help buying companies		
	summarize, analyze, understand, and improve their buying process. The system		
	comes with a number of pre-defined reports, ranging from buying patterns (e.g.,		
	are we buying too much of something or too little?), to reports on the process		
	itself (e.g., who is not approving in a timely manner). This information can help		
	the company refine its practices, say by modifying the approval processes or		
	switching suppliers.		
	<i>Ref. No.</i>		

1. Defining Reports

The system provides a variety of reports to categorize and group the information contained in the system. The reporting mechanism allows employees to parameterize reports and run them, but not to define ad-hoc reports.

5 Employees are able to:

- a. Save the results of any generated report to a file. There are two output formats: one that can be read by spreadsheets, and one that is plain text, for human consumption.
- b. Print any of the generated reports.
- c. Define the reporting period for any report. The period of a report can be described as {All, This Day/Week/Month/Year/Quarter, Last Day/Week/Month/Year/Quarter, Other (where a specific beginning and ending date can be specified)}. The definition of Quarter is set from the system profile.

15 2. Standard Reports for All Employees

Table 7, below, shows standard reports that are available to all employees.

Table 7: Standard reports for all employees

Report Name	Priority
1. Requisitions for specified period	1 (High)
2. Summary of approved orders for a period	1 (High)
3. Requisitions still to be approved, by whom	1 (High)
4. Line items by supplier	1 (High)
5. Line items by approver	1 (High)
6. Average # of lines	1 (High)
7. Requisitions by commodity	2 (Medium)
8. Average time to approve	2 (Medium)
9. Requisitions denied, grouped by whom	3 (Low)

- 30 -

3. Standard Reports available to purchasing agents

Provide the standard reports as shown in Table 8, available to any employee who has the role of purchasing agent:

Table 8: Standard Reports for Purchasing Agents

	Report	Explanation	Priority
5	1. Open order follow-up report		1 (High)
10	2. On-time delivery report by supplier	Need limited set of buckets, such as "on-time", "# of days early", "# of dates late", etc.	1 (High)
15	3. \$ or items by supplier, in alpha order	Output to spreadsheet for graphics	1 (High)
20	4. # of transactions per employee, supplier, dept, div	Output to spreadsheet for graphics	1 (High)
25	5. Summary Report	Supplier, Item, dept, date ordered, date received, Requester, Expected delivery	1 (High)
30	6. Order list for a supplier to date	Only summarizes total of PO	1 (High)
	7. Total orders to suppliers		2 (Medium)
	8. Suppliers, alphabetically	Brief list of suppliers, sorted alphabetically	3 (Medium)
	9. Unreceived orders by Supplier		3 (Medium)
	10. Number of requisitions initiated by a given employee, in some period	Watching for people who consistently order just under an approval limit	3 (Low)
	11. Paper vs. electronic	Number of electronic requests submitted, as compared to number of paper ones	3 (Low)
	12. % of items ordered that were ad-hoc	Tracking ad-hoc items vs. catalog items	3 (Low)

System EnvironmentApproval Flow

Each company generally has its own approval process for defining who has to approve each requisition. The system models this process with a set of *approval rules*, which each company can parameterize and extend. The approval

rules are defined as part of the installation process, but can be modified by the customer's system administrator at any time.

The approval rules are preferably stored in text files that can be edited with any text file editor.

5

### 1. Parameterizing Approval Rules

The simplest form of approval rules is a tabular file format, which describes values to be used in the rules. This file format allows the customer to:

- 10 a. Parameterize the approval rules by editing the values in the tabular file. For example, a company can change the dollar amounts to be associated with approval by various management levels, without changing the approval rule itself.
- b. Change the parameters while the system is running. The system will read in new parameters without downtime.

15

### 2. Approval Rules

For describing the approval rules, the system provides a simple scripting language, generally flexible enough to describe any condition or set of conditions file approval. In one embodiment, each rule has:

- 20 a. A justification field, to be used as explanation for why the rule was invoked.
- b. A predicate, which determines when the rule applies. The predicate can be based on any field in the requisition, such as commodity, currency, amount of purchase, ship-to address, or even the customized (i.e., extensible) fields that this particular company has added.

25

5           c.     A consequent, for when the predicate applies. The consequent designates which role or roles need to approve the requisition. For example, a company might write a rule that requires employees with the role of purchasing agent to approve any requests that are for amounts over \$200 and that have a ship-to address that is different from the default ship-to address. The particular amount, the \$200, will be specified in the tabular file; the predicate-consequent will be in the rules file.

10           d.     A way to describe which approvals can be done serially, and which can be done in parallel. For example, an organization may want the management chain approvals to go serially, but other approvals (like Facilities and IS) to go in parallel.

### 3. Buyer Assignment Rules

15           Each line item in a requisition has an assigned Purchasing Agent. The system sets the assigned Purchasing Agent before submitting the request for approval. Each company can define its own rules for how buyers are assigned, using the same mechanism used for defining approval rules. For example, a company might wish to have the assignment of buyer be dependent both on the type of the commodity and the amount of the purchase.

20

### 4. Escalation and Timing Out

25           The system provides the ability to escalate an approval, either manually or automatically, for occasions when an approver has not responded to a request for approval. Escalating an approval request moves it up the management chain, to the approver's immediate supervisor.

The system provides the following features for escalation:

- 33 -

- a. A requester can escalate a request manually.
- b. If an approver has not responded to a request for approval within the escalation time period defined in the system profile, the system will escalate the approval request automatically. Escalation will continue up the chain as necessary, until someone takes action or there is an employee with no supervisor.
- c. If a requisition has not been approved within some time period, as specified in the system profile, the requisition will time out. That is, any request that has been submitted but not yet fully approved within the specified time frame will be escalated to the administrator.
- d. Once an approval request has been escalated, the original designated approver can no longer take action on that request.

5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1660 1665 1670 1675 1680 1685 1690 1695 1700 1705 1710 1715 1720 1725 1730 1735 1740 1745 1750 1755 1760 1765 1770 1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850 1855 1860 1865 1870 1875 1880 1885 1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100 2105 2110 2115 2120 2125 2130 2135 2140 2145 2150 2155 2160 2165 2170 2175 2180 2185 2190 2195 2200 2205 2210 2215 2220 2225 2230 2235 2240 2245 2250 2255 2260 2265 2270 2275 2280 2285 2290 2295 2300 2305 2310 2315 2320 2325 2330 2335 2340 2345 2350 2355 2360 2365 2370 2375 2380 2385 2390 2395 2400 2405 2410 2415 2420 2425 2430 2435 2440 2445 2450 2455 2460 2465 2470 2475 2480 2485 2490 2495 2500 2505 2510 2515 2520 2525 2530 2535 2540 2545 2550 2555 2560 2565 2570 2575 2580 2585 2590 2595 2600 2605 2610 2615 2620 2625 2630 2635 2640 2645 2650 2655 2660 2665 2670 2675 2680 2685 2690 2695 2700 2705 2710 2715 2720 2725 2730 2735 2740 2745 2750 2755 2760 2765 2770 2775 2780 2785 2790 2795 2800 2805 2810 2815 2820 2825 2830 2835 2840 2845 2850 2855 2860 2865 2870 2875 2880 2885 2890 2895 2900 2905 2910 2915 2920 2925 2930 2935 2940 2945 2950 2955 2960 2965 2970 2975 2980 2985 2990 2995 3000 3005 3010 3015 3020 3025 3030 3035 3040 3045 3050 3055 3060 3065 3070 3075 3080 3085 3090 3095 3100 3105 3110 3115 3120 3125 3130 3135 3140 3145 3150 3155 3160 3165 3170 3175 3180 3185 3190 3195 3200 3205 3210 3215 3220 3225 3230 3235 3240 3245 3250 3255 3260 3265 3270 3275 3280 3285 3290 3295 3300 3305 3310 3315 3320 3325 3330 3335 3340 3345 3350 3355 3360 3365 3370 3375 3380 3385 3390 3395 3400 3405 3410 3415 3420 3425 3430 3435 3440 3445 3450 3455 3460 3465 3470 3475 3480 3485 3490 3495 3500 3505 3510 3515 3520 3525 3530 3535 3540 3545 3550 3555 3560 3565 3570 3575 3580 3585 3590 3595 3600 3605 3610 3615 3620 3625 3630 3635 3640 3645 3650 3655 3660 3665 3670 3675 3680 3685 3690 3695 3700 3705 3710 3715 3720 3725 3730 3735 3740 3745 3750 3755 3760 3765 3770 3775 3780 3785 3790 3795 3800 3805 3810 3815 3820 3825 3830 3835 3840 3845 3850 3855 3860 3865 3870 3875 3880 3885 3890 3895 3900 3905 3910 3915 3920 3925 3930 3935 3940 3945 3950 3955 3960 3965 3970 3975 3980 3985 3990 3995 4000 4005 4010 4015 4020 4025 4030 4035 4040 4045 4050 4055 4060 4065 4070 4075 4080 4085 4090 4095 4100 4105 4110 4115 4120 4125 4130 4135 4140 4145 4150 4155 4160 4165 4170 4175 4180 4185 4190 4195 4200 4205 4210 4215 4220 4225 4230 4235 4240 4245 4250 4255 4260 4265 4270 4275 4280 4285 4290 4295 4300 4305 4310 4315 4320 4325 4330 4335 4340 4345 4350 4355 4360 4365 4370 4375 4380 4385 4390 4395 4400 4405 4410 4415 4420 4425 4430 4435 4440 4445 4450 4455 4460 4465 4470 4475 4480 4485 4490 4495 4500 4505 4510 4515 4520 4525 4530 4535 4540 4545 4550 4555 4560 4565 4570 4575 4580 4585 4590 4595 4600 4605 4610 4615 4620 4625 4630 4635 4640 4645 4650 4655 4660 4665 4670 4675 4680 4685 4690 4695 4700 4705 4710 4715 4720 4725 4730 4735 4740 4745 4750 4755 4760 4765 4770 4775 4780 4785 4790 4795 4800 4805 4810 4815 4820 4825 4830 4835 4840 4845 4850 4855 4860 4865 4870 4875 4880 4885 4890 4895 4900 4905 4910 4915 4920 4925 4930 4935 4940 4945 4950 4955 4960 4965 4970 4975 4980 4985 4990 4995 5000 5005 5010 5015 5020 5025 5030 5035 5040 5045 5050 5055 5060 5065 5070 5075 5080 5085 5090 5095 5100 5105 5110 5115 5120 5125 5130 5135 5140 5145 5150 5155 5160 5165 5170 5175 5180 5185 5190 5195 5200 5205 5210 5215 5220 5225 5230 5235 5240 5245 5250 5255 5260 5265 5270 5275 5280 5285 5290 5295 5300 5305 5310 5315 5320 5325 5330 5335 5340 5345 5350 5355 5360 5365 5370 5375 5380 5385 5390 5395 5400 5405 5410 5415 5420 5425 5430 5435 5440 5445 5450 5455 5460 5465 5470 5475 5480 5485 5490 5495 5500 5505 5510 5515 5520 5525 5530 5535 5540 5545 5550 5555 5560 5565 5570 5575 5580 5585 5590 5595 5600 5605 5610 5615 5620 5625 5630 5635 5640 5645 5650 5655 5660 5665 5670 5675 5680 5685 5690 5695 5700 5705 5710 5715 5720 5725 5730 5735 5740 5745 5750 5755 5760 5765 5770 5775 5780 5785 5790 5795 5800 5805 5810 5815 5820 5825 5830 5835 5840 5845 5850 5855 5860 5865 5870 5875 5880 5885 5890 5895 5900 5905 5910 5915 5920 5925 5930 5935 5940 5945 5950 5955 5960 5965 5970 5975 5980 5985 5990 5995 6000 6005 6010 6015 6020 6025 6030 6035 6040 6045 6050 6055 6060 6065 6070 6075 6080 6085 6090 6095 6100 6105 6110 6115 6120 6125 6130 6135 6140 6145 6150 6155 6160 6165 6170 6175 6180 6185 6190 6195 6200 6205 6210 6215 6220 6225 6230 6235 6240 6245 6250 6255 6260 6265 6270 6275 6280 6285 6290 6295 6300 6305 6310 6315 6320 6325 6330 6335 6340 6345 6350 6355 6360 6365 6370 6375 6380 6385 6390 6395 6400 6405 6410 6415 6420 6425 6430 6435 6440 6445 6450 6455 6460 6465 6470 6475 6480 6485 6490 6495 6500 6505 6510 6515 6520 6525 6530 6535 6540 6545 6550 6555 6560 6565 6570 6575 6580 6585 6590 6595 6600 6605 6610 6615 6620 6625 6630 6635 6640 6645 6650 6655 6660 6665 6670 6675 6680 6685 6690 6695 6700 6705 6710 6715 6720 6725 6730 6735 6740 6745 6750 6755 6760 6765 6770 6775 6780 6785 6790 6795 6800 6805 6810 6815 6820 6825 6830 6835 6840 6845 6850 6855 6860 6865 6870 6875 6880 6885 6890 6895 6900 6905 6910 6915 6920 6925 6930 6935 6940 6945 6950 6955 6960 6965 6970 6975 6980 6985 6990 6995 7000 7005 7010 7015 7020 7025 7030 7035 7040 7045 7050 7055 7060 7065 7070 7075 7080 7085 7090 7095 7100 7105 7110 7115 7120 7125 7130 7135 7140 7145 7150 7155 7160 7165 7170 7175 7180 7185 7190 7195 7200 7205 7210 7215 7220 7225 7230 7235 7240 7245 7250 7255 7260 7265 7270 7275 7280 7285 7290 7295 7300 7305 7310 7315 7320 7325 7330 7335 7340 7345 7350 7355 7360 7365 7370 7375 7380 7385 7390 7395 7400 7405 7410 7415 7420 7425 7430 7435 7440 7445 7450 7455 7460 7465 7470 7475 7480 7485 7490 7495 7500 7505 7510 7515 7520 7525 7530 7535 7540 7545 7550 7555 7560 7565 7570 7575 7580 7585 7590 7595 7600 7605 7610 7615 7620 7625 7630 7635 7640 7645 7650 7655 7660 7665 7670 7675 7680 7685 7690 7695 7700 7705 7710 7715 7720 7725 7730 7735 7740 7745 7750 7755 7760 7765 7770 7775 7780 7785 7790 7795 7800 7805 7810 7815 7820 7825 7830 7835 7840 7845 7850 7855 7860 7865 7870 7875 7880 7885 7890 7895 7900 7905 7910 7915 7920 7925 7930 7935 7940 7945 7950 7955 7960 7965 7970 7975 7980 7985 7990 7995 8000 8005 8010 8015 8020 8025 8030 8035 8040 8045 8050 8055 8060 8065 8070 8075 8080 8085 8090 8095 8100 8105 8110 8115 8120 8125 8130 8135 8140 8145 8150 8155 8160 8165 8170 8175 8180 8185 8190 8195 8200 8205 8210 8215 8220 8225 8230 8235 8240 8245 8250 8255 8260 8265 8270 8275 8280 8285 8290 8295 8300 8305 8310 8315 8320 8325 8330 8335 8340 8345 8350 8355 8360 8365 8370 8375 8380 8385 8390 8395 8400 8405 8410 8415 8420 8425 8430 8435 8440 8445 8450 8455 8460 8465 8470 8475 8480 8485 8490 8495 8500 8505 8510 8515 8520 8525 8530 8535 8540 8545 8550 8555 8560 8565 8570 8575 8580 8585 8590 8595 8600 8605 8610 8615 8620 8625 8630 8635 8640 8645 8650 8655 8660 8665 8670 8675 8680 8685 8690 8695 8700 8705 8710 8715 8720 8725 8730 8735 8740 8745 8750 8755 8760 8765 8770 8775 8780 8785 8790 8795 8800 8805 8810 8815 8820 8825 8830 8835 8840 8845 8850 8855 8860 8865 8870 8875 8880 8885 8890 8895 8900 8905 8910 8915 8920 8925 8930 8935 8940 8945 8950 8955 8960 8965 8970 8975 8980 8985 8990 8995 9000 9005 9010 9015 9020 9025 9030 9035 9040 9045 9050 9055 9060 9065 9070 9075 9080 9085 9090 9095 9100 9105 9110 9115 9120 9125 9130 9135 9140 9145 9150 9155 9160 9165 9170 9175 9180 9185 9190 9195 9200 9205 9210 9215 9220 9225 9230 9235 9240 9245 9250 9255 9260 9265 9270 9275 9280 9285 9290 9295 9300 9305 9310 9315 9320 9325 9330 9335 9340 9345 9350 9355 9360 9365 9370 9375 9380 9385 9390 9395 9400 9405 9410 9415 9420 9425 9430 9435 9440 9445 9450 9455 9460 9465 9470 9475 9480 9485 9490 9495 9500 9505 9510 9515 9520 9525 9530 9535 9540 9545 9550 9555 9560 9565 9570 9575 9580 9585 9590 9595 9600 9605 9610 9615 9620 9625 9630 9635 9640 9645 9650 9655 9660 9665 9670 9675 9680 9685 9690 9695 9700 9705 9710 9715 9720 9725 9730 9735 9740 9745 9750 9755 9760 9765 9770 9775 9780 9785 9790 9795 9800 9805 9810 9815 9820 9825 9830 9835 9840 9845 9850 9855 9860 9865 9870 9875 9880 9885 9890 9895 9900 9905 9910 9915 9920 9925 9930 9935 9940 9945 9950 9955 9960 9965 9970 9975 9980 9985 9990 9995 9999

- 34 -

b. If there is a delegation of authority for an employee, and the date for the delegation has not expired, then the system will allow the delegate to approve in the place of the employee.

c. Log all delegations of authority as part of the audit trail.

5

### Shared Services

#### 1. Authentication and User Rights

All employees must log in and be authenticated in order to use the system. There are three kinds of users in the system: Purchasing Agents, Administrators, and Employees. Purchasing Agents and Administrators are allowed to do some operations that Employees are not allowed to do. Table 9, below, lists the operations that are restricted to certain kinds of users:

Table 9: User Rights Requiring Authentication

Role	Functionality
1. System Administrator	<ul style="list-style-type: none"><li>■ Designate other employees as administrators or purchasing agents</li><li>■ Load new business rules into the server</li></ul>
2. Purchasing Agent	<ul style="list-style-type: none"><li>■ Remove approvals from requisitions</li><li>■ Edit any field of a requisition</li><li>■ Modify the Product Information Database</li><li>■ Modify the specific fields of the supplier database</li></ul>

#### 2. Events and Notification

The system provides a notification mechanism, designed to help keep all interested parties informed about what's going on with a particular requisition. The system defines a set of *events*, which are the triggers for notifying employees, and the recipients of the notifications. In one embodiment, there is no customization of the set of events.

The system will:

a. Provide e-mail notification for each of the defined events, which are summarized in Table 10, below. The notification message preferably includes a hypertext link to the Organizer. *email*

b. Allow employees to customize the frequency of notification per event. The notification frequency can be specified as **Never**, **Immediate**, or **On Interval**, where the interval is an integer number of **Seconds**, **Minutes**, **Hours**, or **Days**. The decision of whether to allow employees to specify **Never** is preferably part of the system profile -- that is, choosing whether it is possible to turn off notification altogether is a decision made on a per-company basis.

10

Table 10: Events Requiring Notification

Event	Action
1. Approval is now required	Notify activated approver.
2. An approver takes action: approves or denies.	Notify requester.
3. New approver or watcher added	Notify requester.
4. Requisition has been modified	Notify requester.
5. Final receipt submitted	Notify Purchasing.
6. PO# Assigned to Requisition Line Item	Notify Requester.
7. Time expired for delivery: if the Need-by date passes and no receipt acknowledgment has been sent.	Notify requester that a receipt is required.
8. Requisition has been escalated to next-level approver.	Notify current approver and activated approver and requester.
9. Requisition is soon to be escalated.	Notify approver.
10. Requisition is soon to time out	Notify requester.
11. Requisition has timed out	Notify requester.

15

20

25

### 3. Database Support

The system uses a database to store all internal data, and record all transactions between clients and the Enterprise Server. In one embodiment, this database resides on an Oracle Database Server.

- 36 -

4. Customer support and feedback

There is an interest in feedback from customer sites to understand how customers are using the system and how they would like to use the system. To encourage such feedback, the system:

5 a. Provides a simple feedback command, to allow customers to e-mail suggestions.

b. Provides a support newsgroup or Website.

c. Sends serious system errors as they occur.

d. Sends line items count statistics on a monthly basis, via email at 10 the end of each month.

5. E-Mail Integration

The system integrates with e-mail programs already in place (e.g., SMTP), so the system can send employees notifications via e-mail.

15

Business Modules

The Business modules are separable pieces of the system.

Ordering Modules

20 An *ordering module* is the piece of the system that takes a fully approved requisition and submits it for fulfillment. When a requisition has been fully approved, the system will:

- Timestamp it with the date and time of the final approval
- Check the requisition to determine which suppliers are involved,

25 and choose a supplier site if there is more than one site for the specified supplier

- 37 -

- Choose the preferred ordering module for each of those suppliers and use it to transmit the order.

The three ordering modules are a Purchasing Card Module, Direct Order Module, and a Purchase Order module.

5

### 1. Purchasing Card Module

The Purchasing Card ordering module supports the use of purchasing cards as a payment mechanism. Purchasing cards (p-cards) can be associated with particular employees or suppliers, but are maintained by an administrator, who ensures that the cards are valid and are being used appropriately.

10

Purchasing card transactions are reconciled on some regular basis with the bank that issued the purchasing card.

10

The system maintains the following data associated with each purchasing card, as shown below in Table 11.

15

Table 11: Data associated with a purchasing card

Card field	Explanation	Intrinsic
Card number	ID of card. Assigned by administrator.	Intrinsic
Employee ID	The employee's ID	Intrinsic
Accounting Codes	From the personal profile	Intrinsic
Expiration date of card	The last day this card can be used in a transaction	Intrinsic
Authorization limits (Single Transaction)	Absolute limit for a single purchase with this card.	Intrinsic
Cardholder name	Can be different from user name; must appear exactly as it does on card.	Extrinsic
Bank Name	Name of issuing bank on the card	Extrinsic
Bank #	ID number of the issuing bank	Extrinsic

20

25

The purchasing card module:

a. Allows administrators to assign cards to employees and modify

the expiration date or authorization limits on purchasing cards.

b. For each fully approved requisition, verifies whether a p-card

can be used for this purchase:

- Ensure that the supplier accepts p-cards. If not, chooses a

different ordering module.

- Chooses a p-card number: If the supplier has a ghosted p-card

number, then that is the preferred p-card number. Otherwise, if the employee

has a p-card number, uses it. Otherwise, chooses another ordering module.

- Checks the amount of the purchase. If it exceeds the per-

transaction limit on the purchasing card, then chooses some

other ordering module.

c. For each transaction using a purchasing card, the system records

data as shown in Table 12. The data is reconciled with banks on a monthly

basis, using a printed report of the transactions. The reports used for

reconciliation show an "allowed variance," because the values (i.e., the p-card

order total) do not include tax and shipping, but the bank values do.

Table 12: Data in a p-card transaction

Field	
Transaction Date	
P-Card Order #	This is the ID (which has to be assigned) of the transaction, which is used to identify the transaction in communications between the supplier and the system.
P-Card Order Total \$	Calculated sum of line items in order. Printed as a range, within allowed variance.
Supplier CC Merchant Number	ID of supplier. Used for reconciliation.

Reports

When a company purchases this module, there are additional standard reports available. Reports as described below in Tables 13 and 14 are provided.

**Table 13: Reports for Employees**

Report Name	Priority
Statement of Account for the Employee for the Credit card period. Lists each transaction.	1 (High)

**Table 14: Reports for Purchasing**

Report Name	Priority
Monthly P-Card Transaction Statistics. This report is intended to be used for manual reconciliation at the bank.	1 (High)
Transaction Audit Listing (Grouped by cardholder)	1 (High)
General Transaction Listing by organization and card holder (For Reconciliation)	1 (High)

**1. Direct Orders (DO's)**

The direct order module is an ordering module that supports communication of orders directly between the buyer and supplier, without storing the requisition in an ERP system. There are typically no constraints on orders under direct billing agreements. The direct order agreement includes terms and conditions, and specifies the frequency of billing.

If there is a direct order agreement with a supplier, then the system:

- a. Checks that the transfer method has been designated for direct order in the item template. If neither the purchase order (PO) or DO order module has been designated in the item template then the supplier profile will be checked for the transfer method. If the supplier profile indicates direct order, then that is the method. Otherwise, it is treated as a PO.

b. Transmits the requisition directly to the supplier via fax or e-mail, as specified in the supplier profile. All requisitions transmitted to the supplier are recorded in the audit trail database. Receiving acknowledgement information is maintained only in the system.

5 c. Provides a report of transactions from the system to help the Purchasing Department reconcile with the master statement from the supplier. The frequency of the report will mirror the frequency of the report from the supplier.

10 2. Purchase Orders  
The purchase order module is an ordering module whose case results in a purchase requisition in the ERP system. The system transmits the requisition to the ERP adapter, as an ERP requisition. Once the requisition is in the ERP, the Purchasing Agent can manipulate it with standard ERP operations to complete the process. For example, the agent typically autocreates a purchase order from the requisition, prints it out, and sends it to the supplier for fulfillment.

#### Receiving

20 After an order is approved and submitted and transferred to the supplier, eventually the supplier will ship the item and the requester will receive it. When an item is received, the requester must acknowledge receiving the item; receipts are the final acknowledgment to trigger payment.

25 The system includes a user interface for acknowledging receipt, which allows employees to record that various items have been received. The receipts will be stored in the system, and there will be no interaction with the underlying

- 41 -

ERP, if there is an ERP present. A system level toggle that can be set during implementation activates the receiving module.

1. Acknowledging receipt of an item

5 The system provides a simple form (the fields of which are shown

below in Table 15) for the employee to indicate that he or she has physically received an item. This receiving interface:

a. Allows an employee to acknowledge receipt of an ordered item

and to record the number of items received, showing the information in the table

10 below. The employee is able to acknowledge either a single line item or an entire requisition.

b. Allows an employee to reject either an entire requisition or an

individual line item. When an employee chooses to reject something, the system will ask for a free-form comment, describing the nature of the rejection. There

15 are no partial rejections on quantity, though the employee can convey that information in a comment.

Table 15: Fields for receipt acknowledgment

Field	Explanation
1. Date received	Defaults to current date and time; can be overridden by the employee
2. Need-by-date	As originally set in the requisition
3 Item description	Link to the line item
4. Comment	Free form comment, for noting problems. Any sort of problem will cause the item to be routed to a purchasing agent, to be handled manually.

Approvals and Notifications

25 If the employee rejects an item, the system notifies Purchasing, and

records the rejection.

Reports

The reports shown in Tables 16 and 17 may be added to the core list of reports included with the core system.

Table 16: Reports for Employees

Report Name	Priority
1. Items not yet received, sorted by supplier and due date	1 (High)
2. Items Received for a period; sorted by supplier	2 (Med)

Table 17: Reports for Purchasing

Report Name	Priority
1. Items not yet received, sorted by supplier and due date	1 (High)
2. Items Received for a period; sorted by supplier	2 (Med)

System Adapters

The system preferably uses adapters when possible, thus avoiding duplicating any information that is already available. But the system is not dependent on the presence of any of these adapters, and can run stand-alone when a company does not have a particular service or there is no adapter available for it.

Directory Service Adapters

The system preferably uses username and password information from a directory service within the company, if there is such a service at the company and if the company has the appropriate adapter. If the company has no authentication service, the system itself stores the employee name and password information, allowing appropriately authorized system administrators to create new users.

- 43 -

1. LDAP Authentication Adapter

A directory service adapter to LDAP is provided. LDAP (Lightweight Directory Access Protocol) is a protocol that provides a standard method for Internet clients, applications and WWW servers to access directory information across the Internet.

5

The LDAP adapter:

- a. Uses the LDAP protocol for accessing corporate-wide passwords and use those passwords for authenticating employees.
- b. Provides real-time authentication of users, if the customer's LDAP server is fast enough to support it.

10

Human Resource Management System Adapters

HRMS systems are used for maintaining employee information such as names, mailstops, and organization structure. If there is no HRMS adapter available, the system supports basic employee management, storing employee data in its own database and allowing appropriately authorized system administrators to Add/Delete/Modify Employees.

15

1. PeopleSoft HRMS Adapter

20

An HRMS adapter to the PeopleSoft system, Version 5 is provided.

The PeopleSoft Adapter:

25

- a. Extracts employee information from the PeopleSoft database on a regular basis and update the system with any new employees that have been created. When new employee updates arrive, the system fills in fields from the HRMS when available. Other additional fields are initialized with the default

- 44 -

values from their immediate supervisor, or from the system profile if the manager is not in the system or cannot be found.

b. Extracts the fields shown in Table 18 below.

**Table 18: Human Resources Data**

Field Name	Explanation	Intrinsic?
1. Employee Number	Alpha-Numeric ID	Intrinsic
2. Employee name	Last, First, MI.	Intrinsic
3. E-mail Address	String	Intrinsic
4. Department	For accounting purposes	Intrinsic
5. Expiration date of employee	Allow for temporary employees, who can "expire".	Intrinsic
6. Immediate Supervisor	Name of employee's immediate supervisor.	Intrinsic
7. Fax number	Phone #	Intrinsic
8. Preferred ship-to address	Address. Physical address, plus maildrop and dropzone or other company-specific info.	Intrinsic
9. Job title, textual	Like organization level, but textual (i.e. "Director")	Extrinsic
10. Telephone number	Phone #	Extrinsic
11. Manager's e-mail address	For displaying during approval routing	Extrinsic
12. Manager's phone number	For displaying during approval routing	Extrinsic

### ERP Adapters

ERP adapters are the pieces that integrate the system with an enterprise ERP system. The adapters are customized for each ERP (e.g., Oracle 10.4, 10.5, 10.6, SAP, Baan, D&B, etc.).

One embodiment of the system provides adapters to Oracle ERP versions 10.4, 10.5, and 10.6.

#### 1. Requisition Adapter

The requisition adapter is the basic piece that integrates with the ERP. It pushes fully-approved requisitions into the ERP, where they are converted into

- 45 -

Purchase Orders on the ERP system. The adapter can pull back the purchase order numbers for those requisitions, and store the PO numbers as extrinsic data fields associated with each line item.

The adapter pushes the following data for each line item:

5	Description	
	Comments	
	Requester name,	if the requester exists in the ERP. If there is no such user name in the ERP, then there will be a standard catch-all user,
10	Approvals	
	Quantity	
	Unit Price	
	Unit of measure	
15	Ship-to and Deliver-to addresses	
	Part number	
	Part description	
	Accounting information	
20	Shipping details – Carrier and carrier method	
	Supplier	

## 2. Units of Measure Adapter

The system pulls the set of Units of Measure from the ERP, and use them in the user interface. The system pulls the following data:

25	Name	
	Abbreviation	
	Base unit of measure	
	Conversion to base unit of measure	

## 30 3. Accounting information Adapter

The system pulls accounting information from the ERP, with whatever accounting details are defined for the company. For example, the accounting fields might be:

35	Company name	
	Company business unit	
	Department	
	Account	
	Project information	

- 46 -

4. Commodity Code Adapter

The system pulls commodity code information from the ERP. The exact structure of the commodity codes depends on the company. For example:

5 Commodity name  
Accounting information per commodity

5. Currency Rate Table Adapter

The system pulls currency rate tables from the ERP, using the rate tables whenever currency conversion is required. The adapter pulls a table of currencies and conversion rates for each, pulling the following information:

10 Currency name  
Currency rate  
15 Date the specified rate is valid  
List of valid currencies

6. Supplier Profile Adapter

The system pulls supplier information from the ERP, on a periodic basis, and store that supplier information in supplier profiles. This adapter:

20 a. Pulls newly-created suppliers from the ERP. Purchasing Agents need to create new supplier profiles when someone requests a new item. That is, when a requisition includes an ad-hoc line item, the Purchasing Agent locates an appropriate supplier and adds a profile for that supplier in the ERP. The changes 25 are then pulled back into the system.

The supplier profile in the system has the fields shown below in Table 19.

Table 19: Supplier Profile Data

Field Name	Explanation	Intrinsic?
1. Supplier ID #	Alpha-Numeric ID	Intrinsic
2. Supplier Name	Textual name of the supplier	Intrinsic
3. E-mail	Supplier's e-mail address	Intrinsic

Field Name	Explanation	Intrinsic?
4. Site codes	Each supplier can have multiple sites; each site code has an associated address.	Intrinsic
5. Dispatch method	Preferred method of transmitting information to the supplier. Either FAX and e-mail.	Intrinsic
6. Fax number	Supplier's fax number	Intrinsic
7. Transaction currency	Supplier's currency, in which transactions take place	Intrinsic
8. Supports p-card?	Boolean indicate whether this supplier accepts p-cards	Intrinsic
9. Ghosted p-card number	P-card to use when dealing with this supplier. If this field is present, the value always overrides the employee's p-card number.	Intrinsic
10. Transfer Method	{ERP, Direct Order, None}	Intrinsic
11. Telephone	Supplier's telephone number	Extrinsic
12. URL	Supplier's Uniform Resource Locator	Extrinsic
13. Our Customer #	Customer Number by which the supplier identifies us	Extrinsic
14. Buyer	Assigned buyer, for use only when there is a direct order agreement with this supplier	Intrinsic
15. Carrier	Supplier's preferred carrier: UPS, FedEx, etc.	Intrinsic
16. Carrier method	2-day air, etc.	Intrinsic
17. Tax code	Tied to location	Extrinsic

#### Features of One Embodiment: System Requirements

1. Scalability

- a. Provides a system that supports at least 10,000 requisitions a month.
- b. Provides a system that supports at least 20,000 suppliers.
- c. Provides a system that supports at least 35,000 employees.
- d. Provides architectural support for multiple instances of the system at a single site. Each instance of the server supports only a single ERP instance. There are no "roll-up" capabilities between multiple instances of the server.

## 2. Supported Client Platforms

A Java client that runs within a Web browser, with Java support.

Tested on the following platforms and systems:

- Microsoft® Internet Explorer® 3.01 and later, on Windows NT 4.0.
- Microsoft® Internet Explorer® 3.01 and later, running on Windows 95.
- Microsoft® Internet Explorer® 3.01 and later, running on the Apple Macintosh®.
- Netscape® Navigator® 3.01 and later, running on Windows NT® 4.0.
- Netscape® Navigator® 3.01 and later, running on Windows 95®.
- Netscape® Navigator® 3.01 and later, running on the Apple Macintosh®.
- Netscape® Navigator® 3.01 and later, running on Sun Solaris.
- Netscape® Navigator® 3.01 and later, running on HP-UX (HP Unix).

## 3. Supported Server Platforms

20 a. Provides an implementation of the server that runs on a dedicated Intel® Pentium Pro system running Microsoft® Windows NT® 4.0.

Supports the following minimum server configuration:

- Processor -- Intel® Pentium Pro or equivalent 200 MHz or greater
- Cache Memory -- 256 KB cache or greater
- Memory -- 128 MB RAM or greater

■ Storage – 4 GB hard drive or greater, depending on the size of the database.

5 b. Provides an implementation of the server that runs on a Sun Machine running Solaris 2.5.1, Oracle RDBMS 7.3.2.3 and the Netscape Enterprise Server 2.0.1.

4. Configuration

10 a. Provides a template for gathering basic information about the site before the installation: host DBMS, operating system, ERP and HRMS interface issues, e-mail interfaces, accounting and purchasing procedures, supplier data, client hardware and software, supported browsers, network configuration, and business rules.

15 b. Configure the extensible fields and approval rules, using a text file editor.

5. Seeding the database

20 For compatibility during the transition period, the system provides the ability to seed the database with requisitions that were approved manually, outside the system. This functionality is intended as a convenience to help a company transition from paper requisitions to electronic.

25 The system allows an administrator to enter a completed paper requisition into the system, without routing for signature. Requisitions entered in this way will appear in reports, but will not generate any approval requests or

notifications, and will not be part of the Product Information Database without the explicit intervention of a Purchasing Agent.

#### 6. Standalone Systems

5 This section describes features of the system that are available only to provide basic functionality when the system is stand-alone: when there is no ERP adapter present.

10 a. Provides the ability to print out purchase orders and transmit them to the supplier. The printed purchase orders include standard notes (such as the supplier's terms and conditions) and a purchase order number. This is the only time the system generates a purchase order.

b. Allows Purchasing Agents to modify the generated PO before it is sent to the supplier.

15 c. Provides a user interface for adding suppliers, providing a simple version of the supplier adapter functionality.

20 It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that the methods and apparatus within the scope of these claims, the their equivalents, be covered thereby.

**WHAT IS CLAIMED IS:**

1        1. A software system for efficient procurement of operating  
2        resources within an enterprise, comprising:  
3                requisition record generating means for generating a requisition record  
4                for a requisition, the requisition record indicating at least an operating resource  
5                that a requestor desires to purchase, the requisition record generating means  
6                generating the requisition record responsive to a combination of:  
7                        input by a requestor; and  
8                        operating resource information in an operating resource  
9                        information database;  
10                approval path determining means, responsive to the requisition record  
11                and to approval rules in an approval rules database, for determining an approval  
12                path for the requisition record, among various ones of a plurality of possible  
13                approvers, required to approve the requisition record;  
14                approval path handling means for guiding the requisition record along  
15                the determined approval path, wherein the approval path handling means  
16                generates a global approval indication in response to the requisition record  
17                successfully traversing the approval path.

1        2. The system of claim 1, and further comprising:  
2                order generating means for generating an order record to a supplier of  
3                the desired operating resource and for communicating the order to the supplier.

1        3. The system of claim 2, wherein the requisition record includes  
2                an indication of the supplier.

- 52 -

1           4. The system of claim 2, wherein the order generating means  
2           includes means for determining a method of communicating the order to the  
3           supplier, responsive to a supplier database.

1           5. The system of claim 1, wherein the approval path handling  
2           means determining means determines the approval path for the requisition record  
3           at least in part in response to a purchase amount field in the requisition record.

1           6. The system of claim 1, wherein the requisition record generating  
2           means includes means for retrieving information about the requestor from a  
3           personal profile database associated with the requestor.

1           7. The system of claim 6, wherein the information retrieved from  
2           the personal profile includes address information representing a destination to  
3           which it is desired for the operating resource to be sent and a department in  
4           which the requestor works.

1           8. The system of claim 6, and further including means for the  
2           requestor to override the information about the requestor retrieved from the  
3           personal profile database associated with the requestor.

1           9. The system of claim 1, wherein the requisition record generating  
2           means includes means for assigning a unique identifier to the requisition.

1           10. The system of claim 1, wherein the requisition record generating  
2           means includes means for receiving a unique identifier assigned to the requisition  
3           by the user via a user input means.

1           11. The system of claim 1, wherein the requisition record generating  
2           means includes:

3           means for receiving an indication of a hold time from the user via a user  
4           input means,

5           wherein the approval path handling means begins to guide the  
6           requisition along the approval path upon occurrence of the hold time.

1           12. The system of claim 1, and further including:

2           means for submitting a requisition in response to the global approval  
3           indication;

4           wherein the requisition record generating means includes:

5           means for receiving an indication of a hold time from the user via a user  
6           input means,

7           wherein the requisition submitting means submits the requisition only  
8           upon occurrence of the hold time.

1           13. The system of claim 1, wherein the requisition record generating  
2           means includes:

3           means for receiving input from the requestor specifying a currency unit,  
4           and

5           means for reporting a purchase amount for the operating resource in  
6           units of the specified currency unit.

1        14. The software system of claim 1, and further comprising:  
2              adaptor means for retrieving data from a legacy database program;  
3              wherein the requisition record generating means completes fields of the  
4              requisition record using the data retrieved from the legacy database program;  
5              whereby avoiding duplication of data already available.

1        15. The software system of claim 14, wherein the adaptor means  
2              includes a directory service adaptor for interfacing to a directory service of the  
3              enterprise.

1        16. The software system of claim 15, wherein the adaptor means is  
2              a human resource management system adaptor for interfacing to a human  
3              resource management system of the enterprise.

1        17. The software system of claim 16, wherein the adaptor means  
2              includes means for interacting to the legacy database program on a periodic basis.

1        18. The software system of claim 14, wherein the adaptor means  
2              includes means, responsive to the global approval indication, for transferring the  
3              requisition to an ERP system of the enterprise.

1        19. The software system of claim 18, wherein the adaptor means  
2              further includes means for retrieving, from the ERP system of the enterprise, a  
3              purchase order number corresponding to the requisition.

1           20. The software system of claim 18, wherein the adaptor means  
2           further includes means for retrieving supplier information from the ERP system  
3           of the enterprise.

1           21. The software system of claim 20, and further comprising:  
2           means for creating a supplier profile based on the supplier information  
3           retrieved from the ERP system of the enterprise.

1           22. The software system of claim 1, wherein:  
2           the approval rules each include a predicate and a consequence; and  
3           the approval path determining means determines whether a particular  
4           one of the approval rules applies by applying the predicate to at least one field of  
5           the requisition record; and  
6           when the approval path determining means determines that a particular  
7           one of the approval rules applies, the approval path determining means  
8           determines the approval path with respect to that approval rule by applying the  
9           consequence of the approval rule.

1           23. The software system of claim 1, wherein:  
2           the approval rules database includes an order definition of which, if any,  
3           required approvers must approve the requisition serially and which, if any, may  
4           approve the requisition in parallel; and  
5           the approval path handling means operates responsive to the order  
6           definition.

- 56 -

1        24. The system of claim 1, wherein the approval path handling  
2        means includes:

3                notification means, responsive to a position of the requisition record  
4                along the approval path, for notifying whichever approver is at that position that  
5                action is required to be taken on the requisition.

1        25. The software system of claim 24, wherein the approval path  
2        handling means includes:

3                status change recognition means that recognizes a change in status of the  
4                requisition as a result of action taken by an approver, and  
5                notification means, wherein the notification means operates responsive  
6                to the status change recognition means to notify the requestor of the status  
7                change.

1        26. The software system of claim 1, wherein:  
2                the action taken by the approver at a particular position in the approval  
3                path includes one of:

4                approving the requisition; and  
5                denying the requisition; and  
6                the approval path handling means moves the requisition to a next  
7                position in the approval path responsive to the approver at the particular position  
8                approving the requisition.

1        27. The software system of claim 26, wherein:  
2                the approval path handling means includes non-response handling  
3                means, responsive to an amount of time during which the requisition is at a

4 particular position in the approval path without any action being taken by the  
5 approver at that position, for moving the requisition to another approver who has  
6 a predetermined relationship to the approver who took no action.

1                   28. The software system of claim 27, wherein:  
2                   the predetermined relationship is indicated by chain of command data  
3                   defined in an ERP database, and  
4                   the system further includes an ERP adaptor for accessing the chain of  
5                   command data from the ERP database.

1                   29. The system of claim 26, and further comprising:  
2                   notification means, wherein in response to the requisition being moved  
3                   to the next position in the approval path, the notification means notifies the  
4                   approver at said next position that action is required to be taken, by that  
5                   approver, on the requisition.

31. The system of claim 1, wherein the approval path handling means includes non-response handling means, responsive to a request from the requestor, for moving the requisition from a first approver who has taken no action to a second approver who has a predetermined relationship to the approver who took no action.

32. The system of claim 31, wherein, responsive to moving the request from the first approver, the approval path handling means prevents the first approver from action on the requisition.

33. The system of claim 31, wherein the predetermined relationship is at least partially defined in the approval rules.

34. The system of claim 1, and further including:  
delegation of authority means for receiving a request from a first approver for delegating the authority of the first approver to a second approver by configuring the approval path handling means to modify the approval path such that the approval path includes the second approver in place of the first approver.

1/8

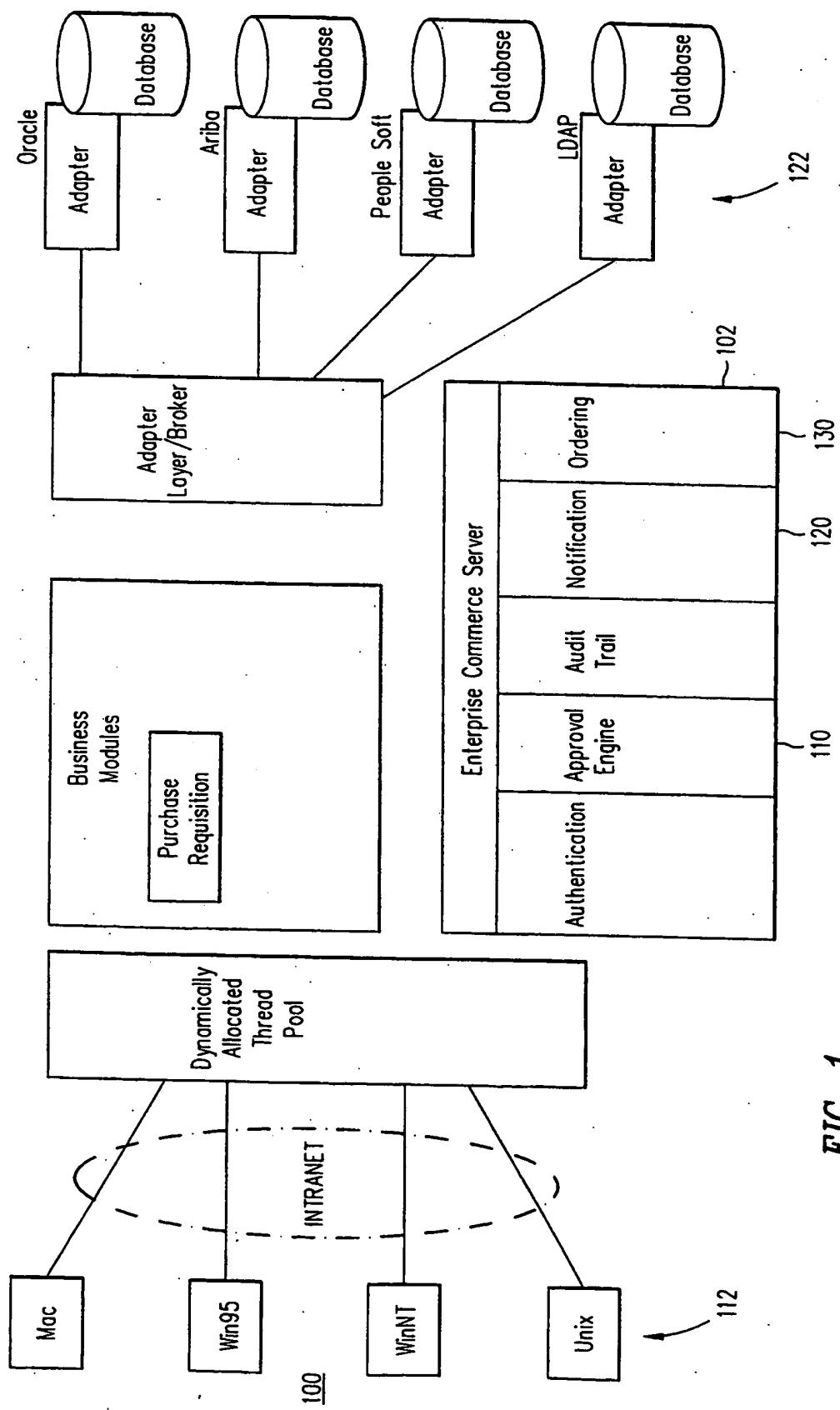


FIG. 1

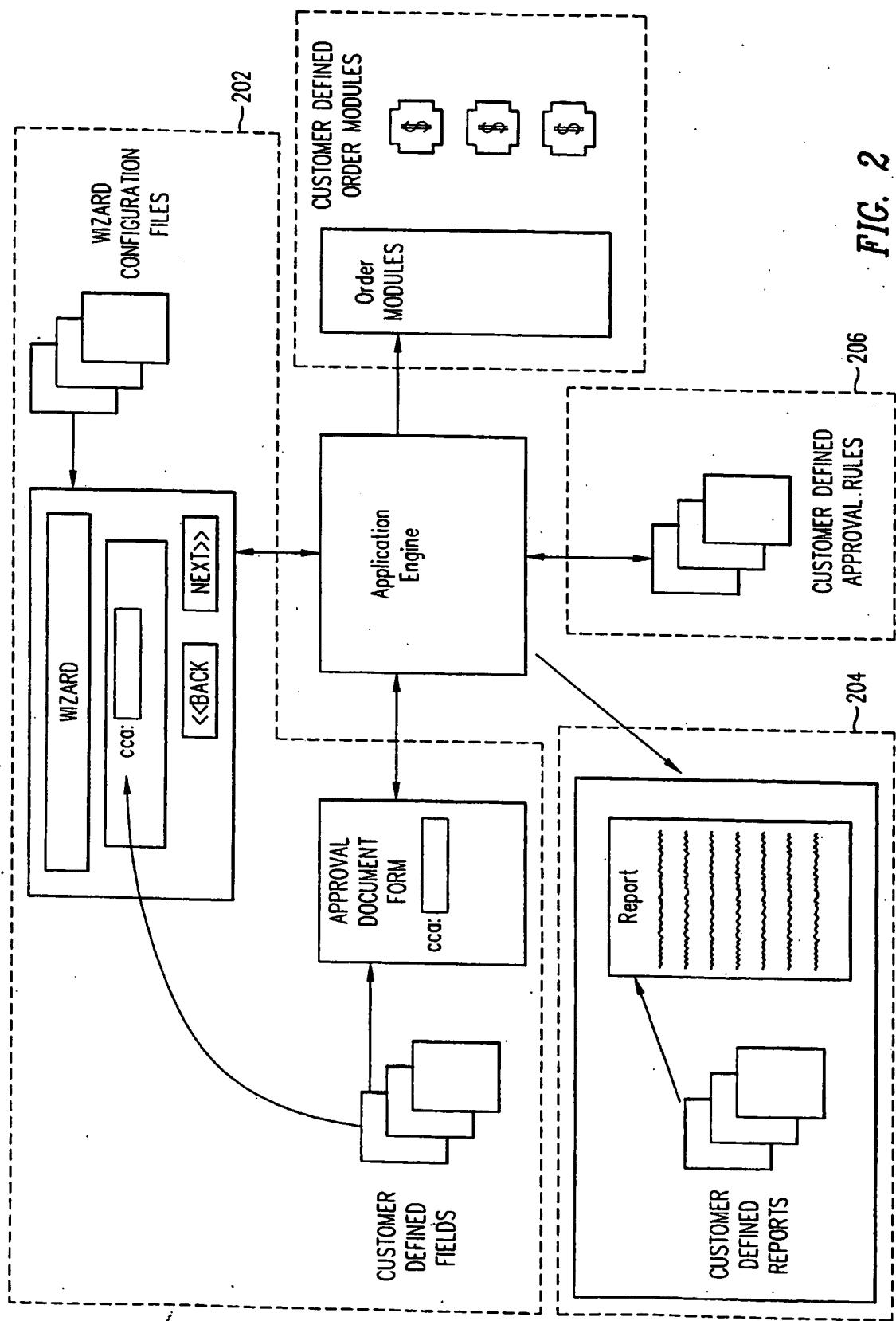
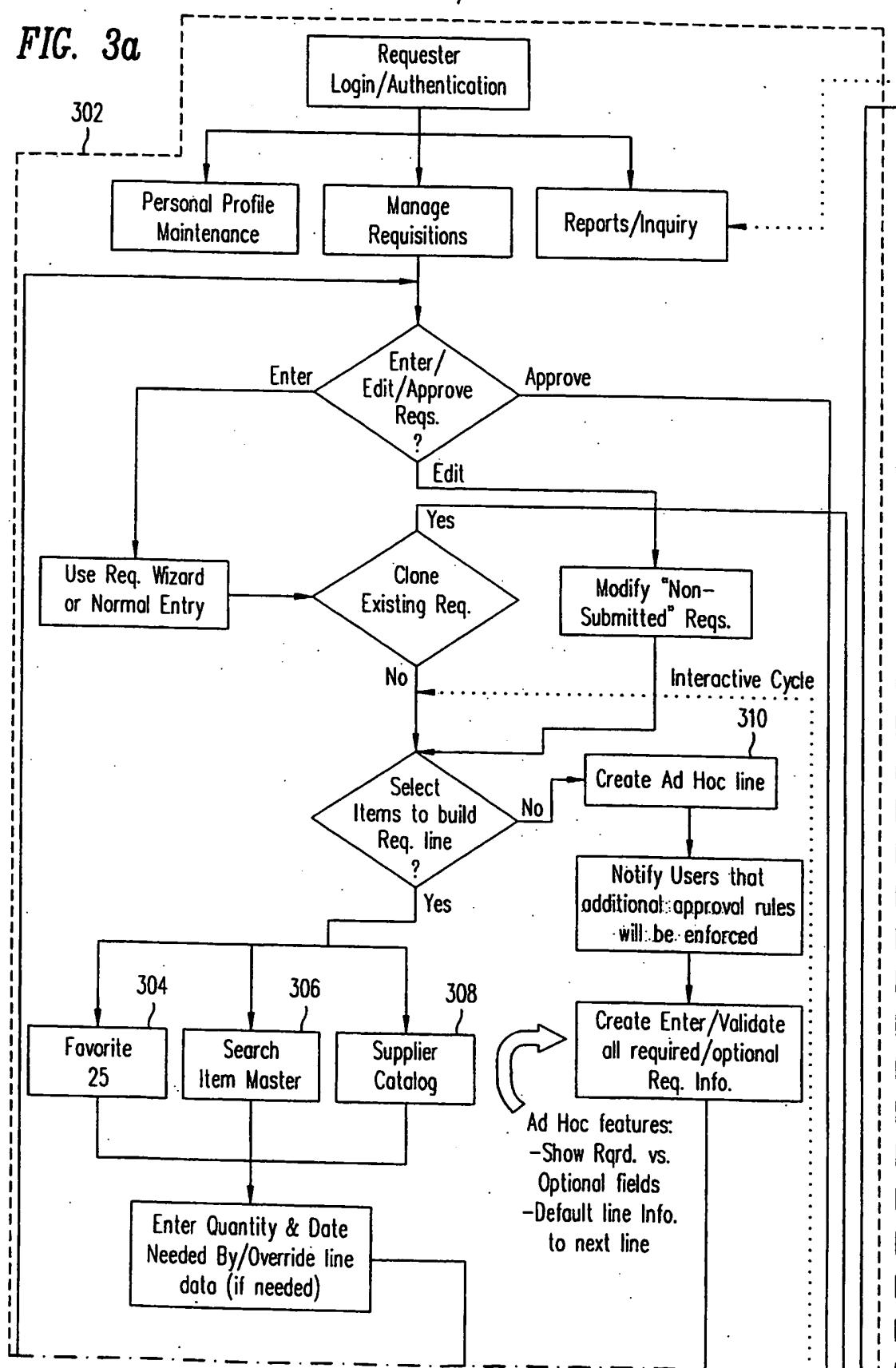


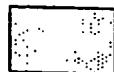
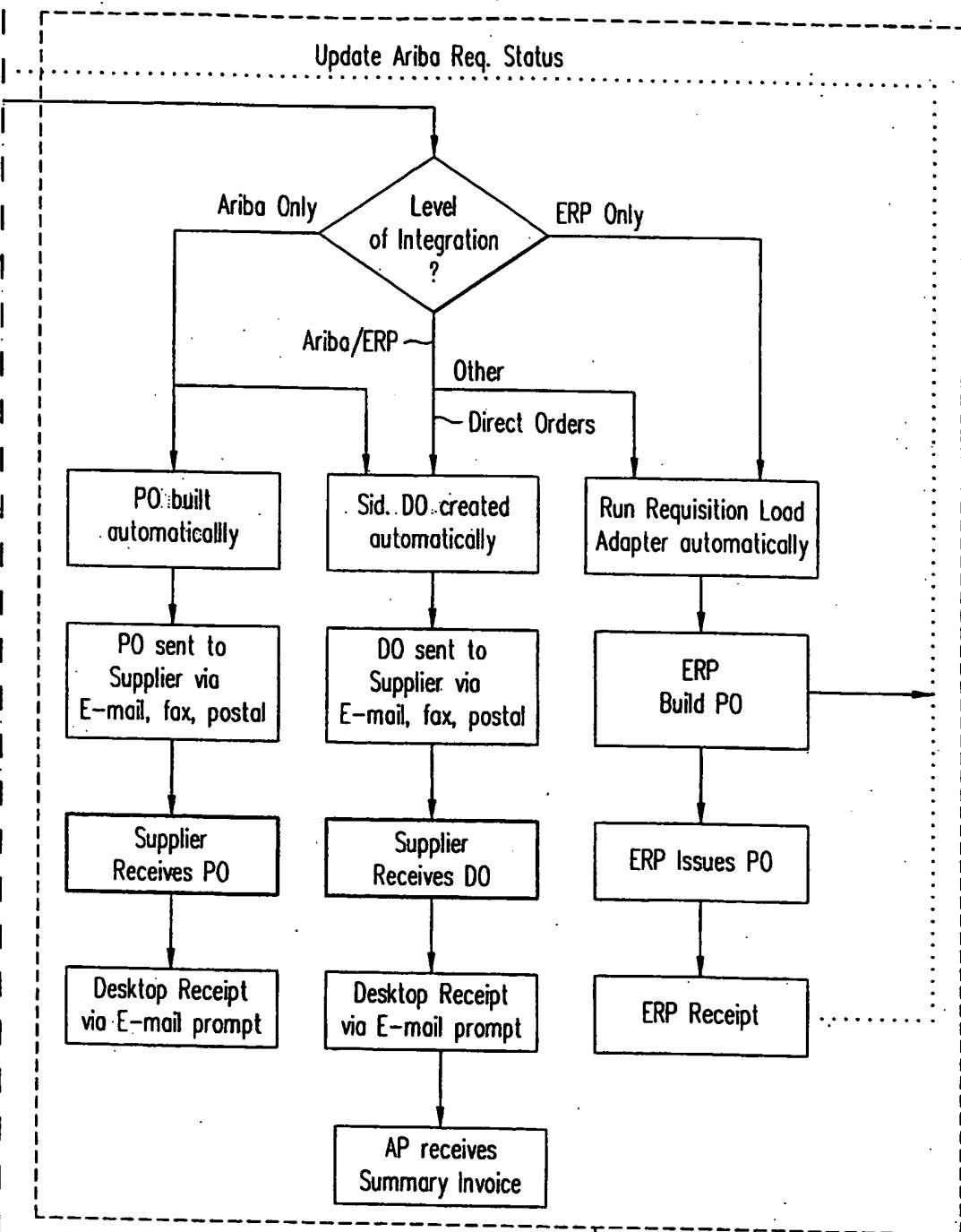
FIG. 2

3/8

FIG. 3a



4/8



= Automated

330

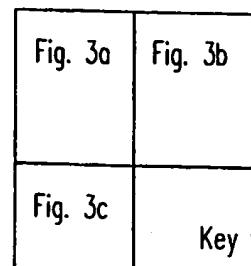


= Manual



= External

FIG. 3b



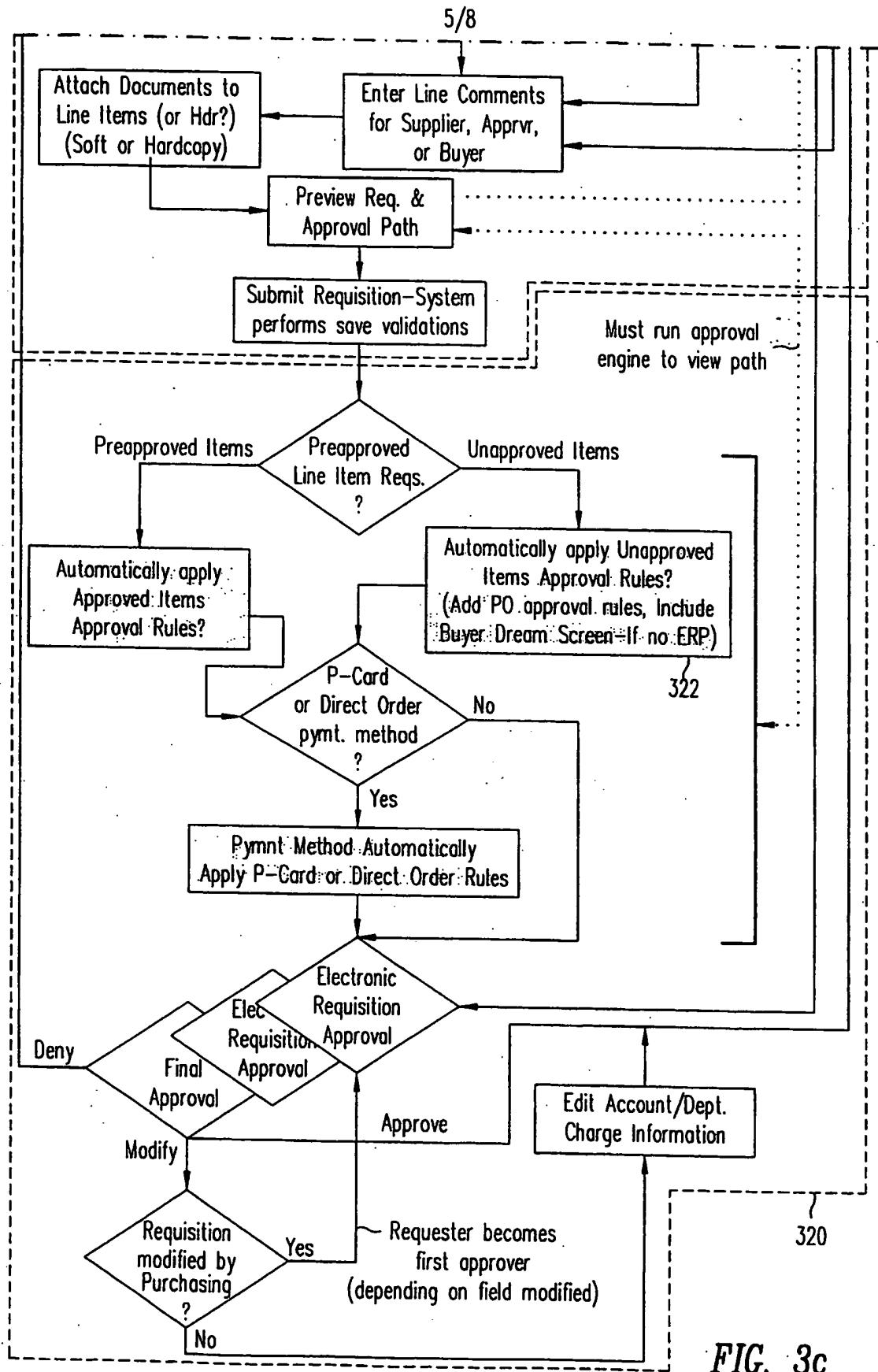


FIG. 3c

6/8

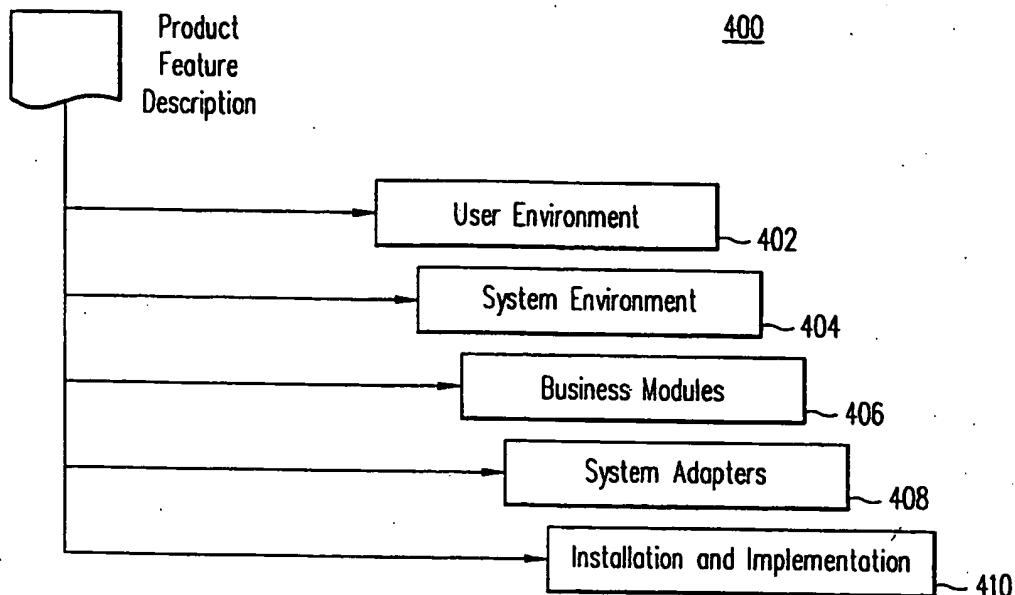


FIG. 4

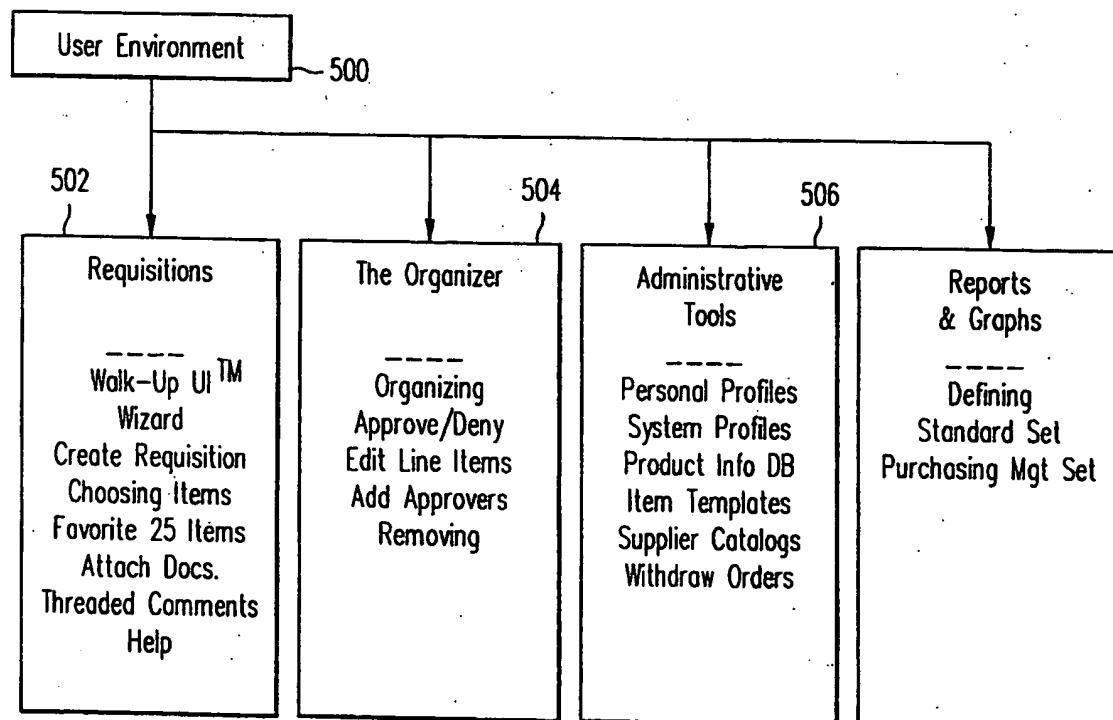


FIG. 5

7/8

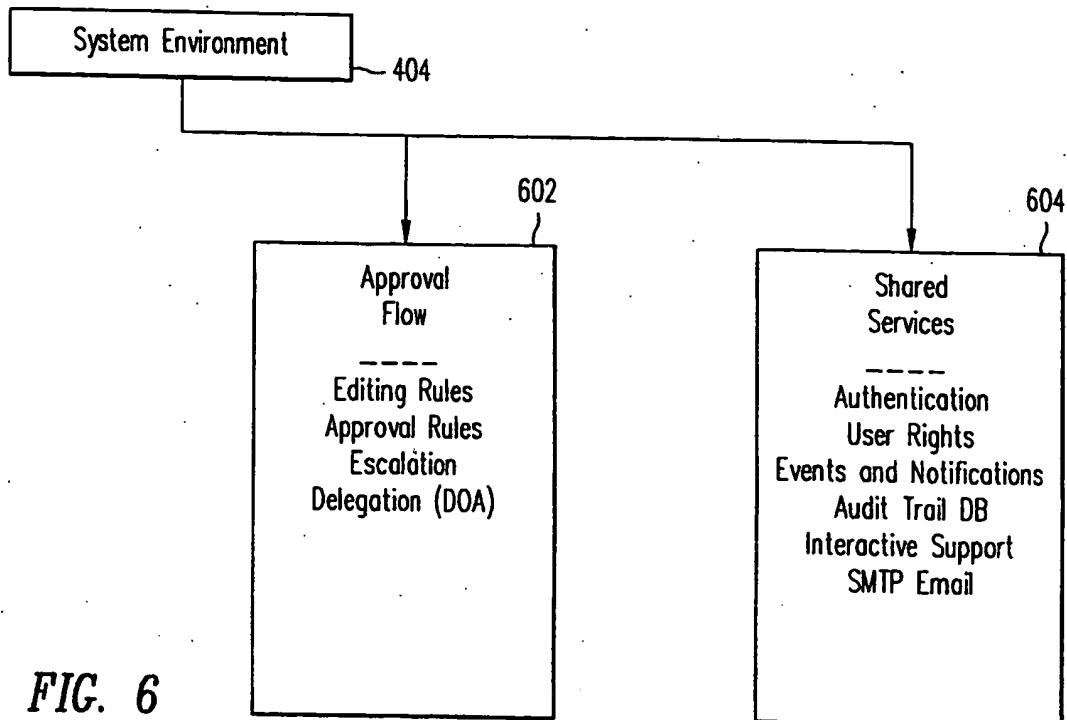


FIG. 6

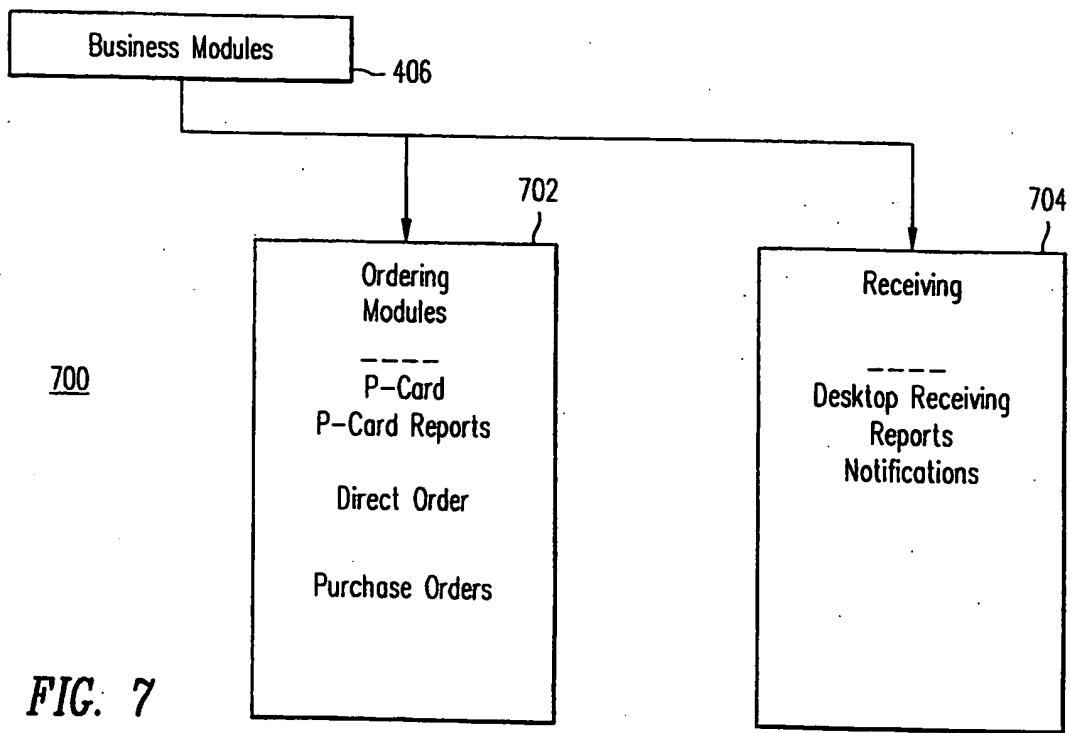


FIG. 7

8/8

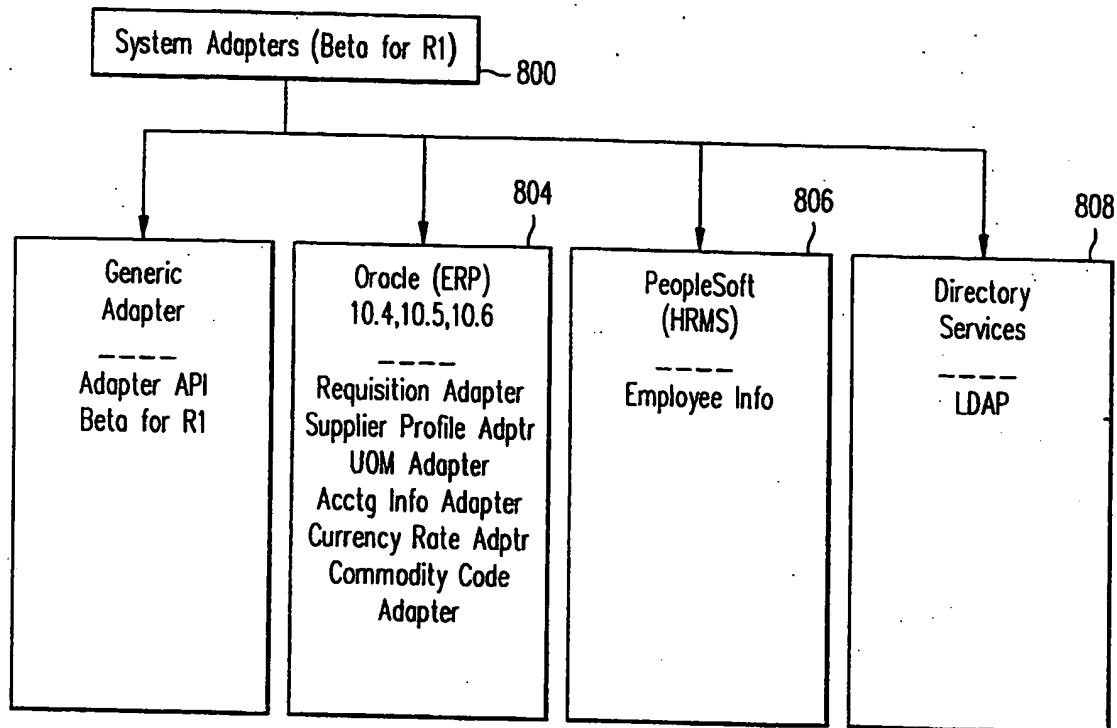


FIG. 8

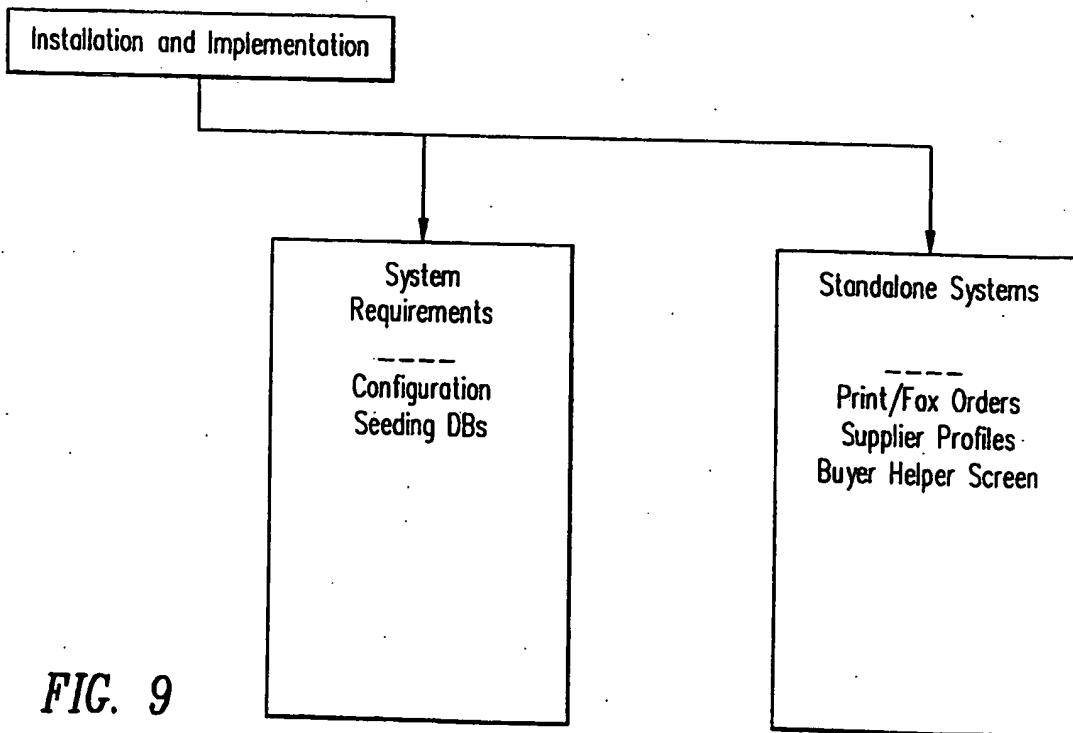


FIG. 9

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/08407

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 319 542 A (KING JR JOHN E ET AL) 7 June 1994	1-7, 9, 10, 13-15, 18-34 8, 11, 12, 16, 17
A	see abstract; claims 1-14; figures 1-4 see column 2, line 50 - line 64 see column 4, line 47 - line 68 see column 5, line 30 - column 7, line 3	
X	"ELECTRONIC DOCUMENT" IBM TECHNICAL DISCLOSURE BULLETIN, Vol. 37, no. 3, 1 March 1994, page 489/490 XP000441554	1-4
A	see the whole document	5-34
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "A" document member of the same patent family

Date of the actual completion of the international search

20 August 1998

Date of mailing of the International search report

04/09/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patenttaan 2  
NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Gardiner, A

**INTERNATIONAL SEARCH REPORT**

International Application No

PCT/US 98/08407

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 999 806 A (CHERNOW FRED ET AL) 12 March 1991 see column 2, line 21 - column 3, line 29 see column 5, line 62 - column 8, line 61	1-34
A	PATENT ABSTRACTS OF JAPAN vol. 012, no. 401 (P-776), 25 October 1988 & JP 63 141176 A (NEC CORP), 13 June 1988 see abstract	1-34
A	PATENT ABSTRACTS OF JAPAN vol. 096, no. 003, 29 March 1996 & JP 07 295901 A (TOSHIBA CORP), 10 November 1995 see abstract see column 2, line 50 - line 64 see column 4, line 47 - line 68 see column 5, line 30 - column 7, line 3	1-34

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/08407

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5319542 A	07-06-1994	JP 2701234 B JP 4247567 A	21-01-1998 03-09-1992
US 4999806 A	12-03-1991	NONE	